



**REMEDIAL ACTION CONTRACT 2 FOR
REMEDIAL, ENFORCEMENT OVERSIGHT, AND
NON-TIME CRITICAL REMOVAL ACTIVITIES
IN REGION 5**

**REVISED HEALTH AND SAFETY PLAN FOR
REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) OVERSIGHT ACTIVITIES AT
PLAINWELL MILL SITE, OPERABLE UNIT NO 7 OF
ALLIED PAPER, INC /PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
PLAINWELL, ALLEGAN COUNTY, MICHIGAN**

Revision 1

**Prepared for
U S Environmental Protection Agency
Region 5
77 W Jackson Blvd
Chicago, IL 60604**

Contract No	EP S5 06 02
Work Assignment No	041 RSBD 059B
Date Prepared	July 17 2009
Prepared by	SulTRAC
SulTRAC Project Manager	Jeffrey Lifka
Telephone No	(312) 201 7491
EPA Work Assignment Manager	Sam Chummar
Telephone No	(312) 886 1434

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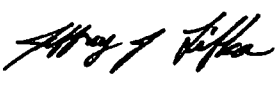
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REVIEWS AND APPROVALS

**CLIENT NAME U S EPA REGION 5
CONTRACT NO EP S5-06 02**


**REVISED HEALTH AND SAFETY PLAN FOR
REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) OVERSIGHT ACTIVITIES AT
PLAINWELL MILL SITE, OPERABLE UNIT NO 7 OF
ALLIED PAPER, INC /PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
PLAINWELL, ALLEGAN COUNTY, MICHIGAN**

We the undersigned have read and approve of the health and safety guidelines presented in this health and safety plan for on site work activities at the Plainwell Mill site

Name	Signature	Date
<u>Chris Draper</u> SulTRAC Health and Safety Representative	<u></u>	<u>07 15 09</u>
<u>Jeffrey Lifka</u> SulTRAC Project Manager	<u></u>	<u>02 26 09</u>

This certifies that SulTRAC has assessed the type risk level and severity of hazards for the project and has selected appropriate personal protective equipment for site personnel in accordance with Occupational Safety and Health Administration Title 29 of the *Code of Federal Regulations* Part 1910.132

Certified by

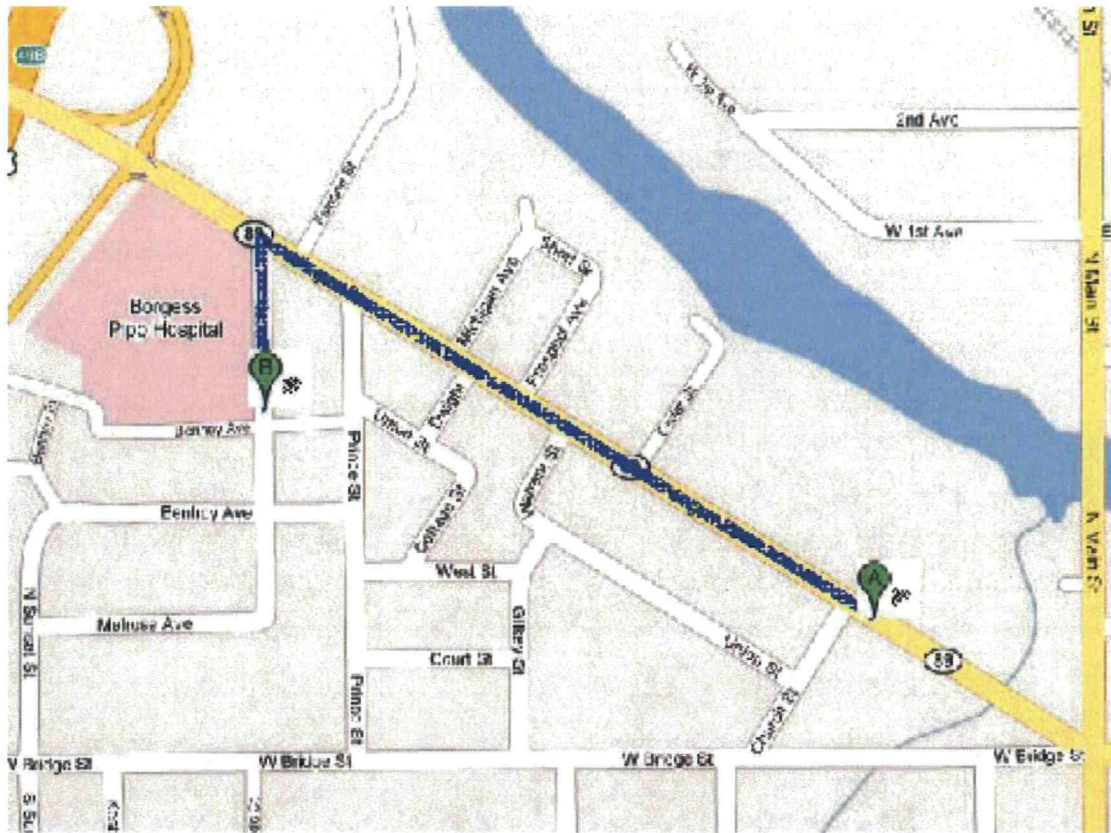
<u>Dave Brown</u> SulTRAC Technical Reviewer	<u></u>	<u>02 26 09</u>
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EMERGENCY INFORMATION
POST ON SITE
EMERGENCY CONTACTS AND ROUTE TO HOSPITAL

Emergency Contact		Telephone No /24 hr Emergency No
U S Coast Guard National Response Center		(800) 424 8802
InfoTrac Chemical Monitoring System		(800) 535 5053
WorkCare		(800) 455 6155
Fire Department		911 or (269) 685 9858
Police Department		911 or (269) 685 9858
SulTRAC Personnel		
Human Resource Development Amy Clark		(626) 470 2516
Health and Safety Representative Chris Draper		(615) 969 1334
Office Health and Safety Coordinator Robert Kondreck		(312) 201 7479/(773) 563 3502
Project Manager Jeffrey Lifka		(312) 201 7491/(630) 542 3092
Site Safety Coordinator Bethany Hand		(312) 201 7457/(734) 904 2944
Client Contact		
Sam Chummar EPA Work Assignment Manager		(312) 886 1434
Medical Emergency		
Hospital Name	Borgess Pipp Hospital	
Hospital Address	411 Naomi Street Plainwell Michigan 49080	
Hospital Telephone No	Emergency – (269) 685 0737 General – (269) 685 0700	
Ambulance Telephone No	911 or (269) 685 0881	
Route to Hospital (see next page hospital route map)		
Exit site (A on map) by turning west onto Allegan Street (M 89) Continue to head northwest on Allegan Street until Naomi Street Turn Left (south) onto Naomi Street and end at Burgess Pipp Hospital (B on map) The hospital will be on the west (right) side of the street The total distance from the site to the hospital is 0.6 mile		

Note This sheet must be posted on site

POST ON SITE HOSPITAL ROUTE MAP



SOURCE: Modified from www.maps.google.com

Note: This sheet must be posted on site.

ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	<i>Code of Federal Regulations</i>
CGI	Combustible gas indicator
COP	City of Plainwell
dBA	Decibels on an A weighted scale
EPA	U S Environmental Protection Agency
ESLI	End of service life indicator
FI	Field Investigation
FS	Field Study
FSP	Field Sampling Plan
HASP	Health and Safety Plan
HCl	Hydrochloric acid
HEPA	High efficiency particulate air
HNO ₃	Nitric acid
HSR	Health and safety representative
IDLH	Immediately dangerous to life or health
LEL	Lower explosive limit
MDL	Method Detection Limits
mg/m ³	Milligrams per cubic meter
mL	Milliliter
MSDS	Materials Safety Data Sheet
NA	Not applicable
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priorities List
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PEL	Permissible exposure limit
PID	Photoionization detector
ppb	Parts per billion
PPE	Personal Protective Equipment
ppm	Parts per million
PRP	Potentially responsible party
QAPP	Quality Assurance Project Plan
RAC	Remedial Action Contract
REL	Recommended exposure limit
Rem	Roentgen equivalent man units
RI	Remedial investigation
ROD	Record of Decision

SAP	Sampling and Analysis Plan
SCBA	Self contained breathing apparatus
SOP	Standard Operating Procedure
SOW	Statement of work
SSC	Site Safety Coordinator
SWP	Safe work practices
Tetra Tech	Tetra Tech EM Inc
TLV	Threshold limit value
TLD	Thermoluminescence detector
TSCA	Toxic Substances Control Act
TWA	Time weighted average
VOC	Volatile organic compound
WA	Work assignment

1 0 INTRODUCTION

SulTRAC a Joint Venture between Tetra Tech EM Inc (Tetra Tech) and Sullivan International Group received Work Assignment No 041 RSBD 059B from the U S Environmental Protection Agency (EPA) under Contract No EP S5 06 02 to conduct oversight of the potentially responsible party s (PRP) remedial investigation/ feasibility study (RI/FS) at the Plainwell Mill Site Operable Unit No 7 of Allied Paper Inc /Portage Creek/Kalamazoo River Superfund Site (the Site) The site specific health and safety provisions in this document have been developed for use during split sampling and PRP oversight activities at the Site This document addresses items specified under Occupational Safety and Health Administration (OSHA) Title 29 of the *Code of Federal Regulations* (CFR) Part 1910.120 (b) Final Rule This health and safety plan (HASP) will be available to all on site personnel who may be exposed to hazardous on site conditions including SulTRAC and subcontractor personnel participating in split sampling and oversight activities and all site visitors including regulatory agency representatives

The purpose of this HASP is to define requirements and designate protocols that SulTRAC will follow during split sampling and PRP oversight activities at the Plainwell Mill Site All SulTRAC personnel subcontractors working with SulTRAC and site visitors who are observing SulTRAC s activities must be informed of site emergency response procedures and any potential fire explosion health or safety hazards associated with on site activities This HASP summarizes potential hazards and defines protective measures planned for SulTRAC s oversight activities

The PRP has primary responsibility for RI/FS activities conducted at the Plainwell Mill Site for defining health and safety requirements site control zones action levels and emergency response procedures and for conducting environmental monitoring during field investigations Thus in addition to the requirements outlined in this HASP SulTRAC must comply with any additional health and safety requirements in the PRP s plan SulTRAC s site safety coordinator (SSC) will work with the PRP s health and safety representative to coordinate activities and to ensure that SulTRAC s HASP is implemented in a manner that is consistent with the PRP s overall health and safety requirements for the Plainwell Mill Site

This plan must be reviewed and approved by the SulTRAC health and safety representative (HSR) or a designee and the SulTRAC project manager (see the Reviews and Approvals form after the Contents in this document) The Compliance Agreement form in Appendix A must be signed by all personnel before

they enter the site. Protocols established in this HASP are based on (1) site conditions and health and safety hazards known or anticipated to be present and (2) available site data. This plan is intended solely for use during proposed activities described in the corresponding site specific work plan. Specifications herein are subject to review and revision based on actual conditions encountered in the field during site activities. Significant revisions to this plan must be approved by the SulTRAC project manager and the SulTRAC HSR. SulTRAC employees must also follow safety requirements taught during safety training and described in the Tetra Tech Health and Safety Manual (Tetra Tech 1999) and the Sullivan International Group Health and Safety Manual.

2.0 HEALTH AND SAFETY PERSONNEL AND PLAN ENFORCEMENT

This section describes responsibilities of project personnel, summarizes requirements for subcontractors and SulTRAC visitors who wish to enter the Plainwell Mill Site, and discusses HASP enforcement.

2.1 PROJECT PERSONNEL

The following personnel and organizations are associated with planned activities at the site. The organizational structure will be reviewed and updated as necessary during the course of the project.

<u>Name/Title</u>	<u>Responsibility</u>	<u>Telephone No.</u>
Client Representative		
Sam Chummar	Work Assignment Manager	(312) 886 1434
SulTRAC Personnel		
Jeffrey Lifka	Project Manager	(312) 201 7491
Chris Draper	HSR	(615) 969 1334
Bethany Hand	Site Safety Coordinator (SSC)	(312) 201 7457
Bethany Hand	Field Team Leader	(312) 201 7457

The SulTRAC project manager, field manager, SSC, and HSR will be responsible for implementation and enforcement of the provisions of this HASP. Their duties and the expectations for SulTRAC employees are described in the following sections.

2 1 1 Project Manager and Field Manager

The SulTRAC project manager has ultimate responsibility for ensuring implementation of the requirements set forth in this HASP. Some of this responsibility may be achieved through delegation to site dedicated personnel who report directly to the project manager. The project manager shall regularly confer with site personnel regarding health and safety compliance.

The SulTRAC field manager will direct oversight field activities and maintain day to day responsibility for ensuring implementation of the HASP. Subcontractor compliance with the HASP shall be monitored by the field manager. The field manager will report directly to the project manager any health and safety related issues.

2 1 2 Site Safety Coordinator

The SulTRAC SSC will be appointed by the project manager and will be responsible for field implementation of tasks and procedures specified in this HASP. The SSC will have advanced field work experience and be familiar with health and safety requirements specific to the project. It is expected that the PRP contractor will conduct daily tailgate meetings and maintain a daily log identifying personnel on site. SulTRAC oversight personnel will attend the PRP contractor daily tailgate meetings. If the PRP contractor does not conduct daily tailgate meetings, SulTRAC personnel will complete and sign the Daily Tailgate Safety Meeting form (Form HST 2) and the Compliance Agreement (Form HSP 4) provided in Appendix A. If the PRP contractor does not maintain daily site logs, SulTRAC oversight personnel will maintain the Daily Site Log (Form SSC 1 in Appendix A).

2 1 3 Health and Safety Representative

The SulTRAC HSR is responsible for administration of the company health and safety program. The HSR will act in an advisory capacity to project managers and site personnel for project specific health and safety issues. The SulTRAC project manager will establish a liaison between representatives of EPA and the HSR on matters relating to health and safety.

2 1 4 SulTRAC Employees

SulTRAC employees are expected to fully participate in implementing the site HASP by obtaining necessary training, attending site safety meetings, always wearing designated personal protective

equipment (PPE) complying with site safety and health rules and advising the SulTRAC SSC of health and safety concerns at the site

2.2 SUBCONTRACTORS

Any subcontractor personnel participating in split sampling and PRP oversight will be required to read and comply with all sections of this plan. All subcontractor personnel entering the site must sign the Compliance Agreement form (see Appendix A). Subcontractor personnel must comply with all applicable 29 CFR 1910.120 training, fit testing, and medical surveillance requirements. Subcontractors are responsible for providing PPE required by this plan for their personnel (see Section 6.1 Protective Equipment and Clothing) and are directly responsible for the health and safety of their employees. At this time, SulTRAC does not anticipate the need to use subcontractors during oversight activities.

2.3 VISITORS

All SulTRAC site visitors will be required to read the HASP and sign the Compliance Agreement form (see Appendix A). Visitors will be expected to comply with relevant OSHA requirements. Visitors will also be expected to provide their own PPE required by the HASP. Visitors who have not met OSHA training, medical surveillance, and PPE requirements are not permitted to enter areas where exposure to hazardous materials is possible.

2.4 HEALTH AND SAFETY PLAN ENFORCEMENT

This HASP applies to all site activities and all SulTRAC personnel working on the Plainwell Mill Site. HASP enforcement shall be rigorous. Violators of the HASP will be verbally notified upon first violation, and the violation will be noted by the SulTRAC SSC in a field logbook. Upon second violation, the violator will be notified in writing, and the SulTRAC project manager and the violator's supervisor will be notified. A third violation will result in a written notification and violator's eviction from the site. The written notification will be sent to human resources and the HSR.

Personnel will be encouraged to report to the SSC any conditions or practices that they consider detrimental to their health or safety or those they believe are in violation of applicable health and safety standards. Such reports may be made orally or in writing. Personnel who believe that an imminent danger threatens human health or the environment will be encouraged to bring the matter to the immediate attention of the SSC for resolution.

At least one copy of this HASP will be available to all site personnel at all times. Minor changes in HASP procedures will be discussed at the beginning of each work day by the SSC at the daily tailgate safety meeting. Significant plan revisions must be discussed with the HSR and project manager.

3 0 SITE BACKGROUND

The Plainwell Paper Mill Site (Site) Operable Unit 7 of the Allied Paper/Portage Creek/Kalamazoo River site is located at 200 Allegan Street Plainwell Allegan County Michigan. Based on previous activities conducted, the subject property is included on the National Priorities List (NPL) as part of the Superfund site known as Allied Paper Inc /Portage Creek/Kalamazoo River and could be included in the Record of Decision (ROD). The Site was used for papermaking operations since the early 1880s under a number of different owners. The original footprint of the mill and the Site itself has increased since its inception through 1995 when the Simpson Plainwell Paper Company purchased the final addition. The current PRP Weyerhaeuser Company owned the company between 1961 and 1970. The City of Plainwell (COP) purchased the property out of bankruptcy and is currently discussing re use plans. The Plainwell Paper Office Building is being prepared for use as the new town hall.

3 1 SITE DESCRIPTION

Figures 1 and 2 show the Site location and Site layout respectively. The approximately 34 acres of land is occupied by (1) the now vacant Plainwell Paper Mill, (2) wastewater treatment structures associated with paper manufacturing, and (3) the vacant Specialty Minerals Inc property. The Site is currently owned by the COP and is bordered by the Kalamazoo River to the north, mill race and commercial properties to the east, Allegan Street (M 89) and mixed residential/commercial properties to the south, and residential properties and COP Sewage Treatment Plant to the west.

3 2 SITE HISTORY

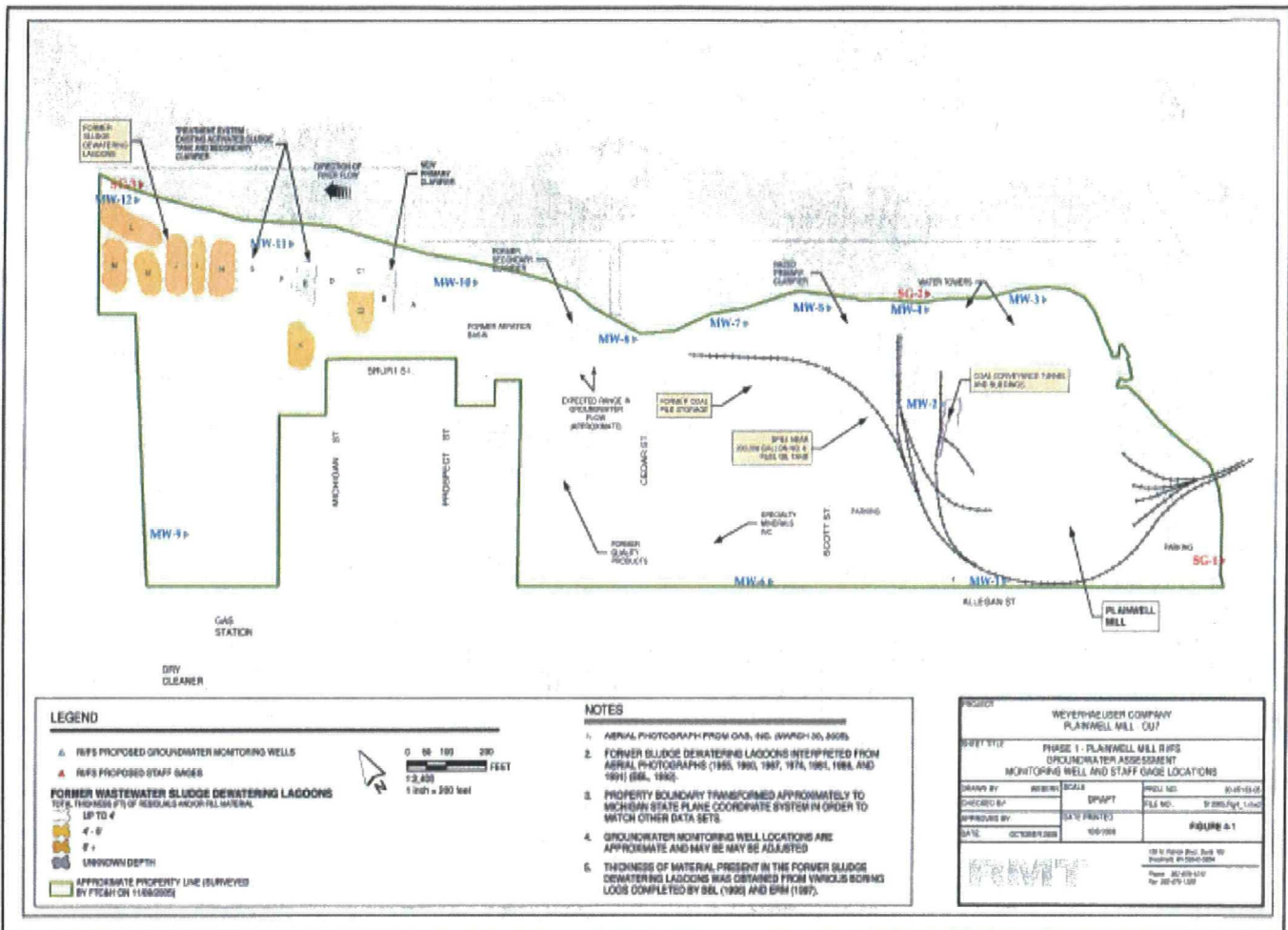
The Plainwell Mill Site was used for papermaking operations for over 100 years. Operations began at least as early as 1884, ending in 2000 when the property owner filed for bankruptcy. The paper mill changed owners several times throughout its history until its final owner, the Simpson Plainwell Paper Company, purchased it in 1987. The current PRP Weyerhaeuser Company owned the company between 1961 and 1970. The COP now owns the Site and is discussing re use of the property.

FIGURE 1
SITE LOCATION



SOURCE: Modified from RMT, Inc. 2008. "Initial Groundwater and Underground Coal Tunnel Assessment: Operable Unit 7 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site." October.

**FIGURE 2
SITE LAYOUT**



SOURCE: Modified from RMT, Inc. 2008. "Initial Groundwater and Underground Coal Tunnel Assessment: Operable Unit 7 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site." October.

Most production took place adjacent to the Kalamazoo River while the remainder of the property lay between the production area and the residential areas. Prior to 1954, wastewater and sludge was discharged directly into the river. Wastewater sludge lagoons were eventually added on site with use beginning after 1954. The treated and dewatered sludge was taken directly to an off site landfill. Additional treatments and mechanical dewatering began in 1981 (RMT Inc. 1996). A fuel oil spill occurred at the Site in the north central portion in 1999.

3.3 PLANNED ACTIVITIES

Field activities to be performed during the PRP Phase II RI/Field Investigation (FI) of soil, groundwater and surface water, and Data Acquisition will include the following tasks:

- Oversight of FI and Data Acquisition activities
- Oversight of split sampling events

4.0 SITE SPECIFIC HAZARD EVALUATION

Field activities and physical features of the Site may expose field personnel to a variety of hazards. This section provides information on potential chemical and physical hazards related to site activities and possible impacts of hazardous materials.

4.1 CHEMICAL HAZARDS

Chemicals that may be present at the site are listed in Table 1. These chemicals pose various physical, chemical, and toxicological hazards. Potential routes of exposure include dermal (skin) contact, inhalation, and ingestion. The chemicals may also contaminate equipment, vehicles, instruments, and personnel. The overall health threat from exposure to these chemicals is uncertain because of inability to predict (1) actual concentrations to which personnel could be exposed, (2) actual duration of exposure, and (3) effects of low level exposure to a mixture of chemicals. However, SulTRAC believes that the potential for high level exposure is limited.

Specific information on potential chemical hazards at the site is provided in Table 1, including exposure limits, anticipated exposure routes, and toxic characteristics. Table 2 provides a task hazard analysis of the planned field activities listed in Section 3.3.

TABLE 1
POTENTIAL CHEMICAL HAZARDS
PLAINWELL PAPER MILL SITE

Chemical and Media	Exposure Limits and IDLH Level	Exposure Routes	Toxic Characteristics
Coal Tar Pitch Volatiles <ul style="list-style-type: none"> • Benzo(a)pyrene • Phenanthrene • Dibenzo(a,h)anthracene Soil	PEL = 0.2 mg/m ³ REL = 0.1 mg/m ³ TLV = 0.2 mg/m ³ IDLH = 80 mg/m ³	<ul style="list-style-type: none"> • Inhalation • Skin/eye contact 	Dermatitis bronchitis potential occupational carcinogen
PCBs (54% Chlorine) Groundwater Soil	PEL = 0.5 mg/m ³ REL = 0.001 mg/m ³ TLV = 1 mg/m ³ IDLH = 5 mg/m ³	<ul style="list-style-type: none"> • Inhalation, • Skin absorption • Eye contact • Ingestion 	Irritation eyes chloracne liver damage reproductive effects potential occupational carcinogen
PCBs (42% Chlorine) Groundwater Soil	PEL = 1 mg/m ³ REL = 0.001 mg/m ³ TLV = 1 mg/m ³ IDLH = 5 mg/m ³	<ul style="list-style-type: none"> • Inhalation • Skin absorption • Eye contact • Ingestion 	Irritation eyes chloracne liver damage reproductive effects potential occupational carcinogen
Arsenic Groundwater Soil	PEL = 0.010 mg/m ³ REL = 0.002 mg/m ³ (for 15 mins) TLV = 0.01 mg As/m ³ IDLH = 5 mg/m ³ (as As)	<ul style="list-style-type: none"> • Inhalation • Skin absorption • Eye contact • Ingestion 	Ulceration of nasal septum dermatitis gastrointestinal disturbances peripheral neuropathy respiratory irritation, hyperpigmentation of skin potential occupational carcinogen

TABLE 1 Continued

**POTENTIAL CHEMICAL HAZARDS
PLAINWELL PAPER MILL SITE**

Chemical and Media	Exposure Limits and IDLH Level	Exposure Routes	Toxic Characteristics
Cadmium Groundwater	PEL = 0.005 mg/m ³ TLV = 0.01 mg/m ³ (total dust) 0.002 mg/m ³ (respirable dust) IDLH = 9 mg/m ³ (as cadmium)	<ul style="list-style-type: none"> • Inhalation • Ingestion 	Pulmonary edema, dyspnea, cough chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, anosmia, emphysema, proteinuria, mild anemia, potential occupational carcinogen
Copper Groundwater	PEL = 1 mg/m ³ REL = 1 mg/m ³ TLV = 1 mg/m ³ IDLH = 100 mg/m ³ (as copper)	<ul style="list-style-type: none"> • Inhalation • Skin absorption • Eye contact • Ingestion 	Irritation of eyes, respiratory system, cough, dyspnea (breathing difficulty), wheezing
Lead Groundwater Soil	PEL = 0.050 mg/m ³ REL = 0.050 mg/m ³ TLV = 0.15 mg/m ³ IDLH = 100 mg/m ³ (as lead)	<ul style="list-style-type: none"> • Inhalation • Skin absorption • Eye contact • Ingestion 	Lassitude, insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis, wrist, ankles, encephalopathy, kidney disease, irritation, eyes, hypertension

TABLE 1 Continued

**POTENTIAL CHEMICAL HAZARDS
PLAINWELL PAPER MILL SITE**

Chemical and Media	Exposure Limits and IDLH Level	Exposure Routes	Toxic Characteristics
Asbestos Building materials	PEL = 0.2 mg/m ³ REL = CARC 0.1 fiber/cm ³ TLV = 0.1 fiber/cm ³ IDLH = CARC ALARA	<ul style="list-style-type: none"> • Inhalation • Eye contact 	Asbestosis (chronic exposure) dyspnea (breathing difficulty) interstitial fibrosis restricted pulmonary function, finger clubbing irritation eyes [potential occupational carcinogen]
Mercury Groundwater Soil	PEL = 0.1 mg/m ³ [skin] REL = 0.05 mg/m ³ [skin] TLV = Mercury vapor 0.025 mg/m ³ [skin] Aryl & inorganic compounds 0.1 mg/m ³ IDLH = 10 mg/m ³ (as mercury)	<ul style="list-style-type: none"> • Inhalation • Skin absorption • Eye contact • Ingestion 	Irritation eyes skin cough, chest pain dyspnea, bronchitis pneumonitis tremor insomnia, irritability indecision, headache lassitude stomatitis salivation gastrointestinal disturbance anorexia, weight loss proteinuria

Notes

	The number also applies other constituent containing compounds
ALARA	Exposure to be kept "as low as reasonably achievable"
CARC	Known or potential occupational carcinogen
IDLH	Immediately dangerous to life or health
mg/m ³	Milligrams per cubic meter
PCB	Polychlorinated biphenyl
PEL	Permissible exposure limit
REL	Recommended exposure limit
TLV	Threshold limit value

Sources

American Conference of Governmental Industrial Hygienists (ACGIH) No date "Threshold Limit Values and Biological Exposure Indices for 2008"

National Institute for Occupational Safety and Health 2005 Pocket Guide to Chemical Hazards U.S. Department of Health and Human Services U.S. Government Printing Office Washington, D.C. September

Occupational Safety & Health Administration (OSHA) 2009 "Occupational Safety and Health Guideline for Mercury Vapor" July
<http://www.osha.gov/SLTC/healthguidelines/mercuryvapor/recognition.html>

TABLE 2
TASK HAZARD ANALYSIS
PLAINWELL PAPER MILL SITE

Task	Potential Hazard	Controls	Initial Level of Protection	Upgraded Level of Protection
Split Sampling Oversight	Chemicals (PAHs VOCs PCBs metals) Heat stress Utilities	Air Monitoring Limited site access Surveys for buried and overhead utilities	Level D = Steel toed boots hard hat, safety glasses nitrile gloves	Modified Level D ^a = Level D plus Tyvek coveralls as needed
Field Oversight of Investigation and Data Acquisition	Chemicals (PAHs VOCs PCBs metals) Heat stress Utilities	Air Monitoring Limited site access Surveys for buried and overhead utilities	Level D = Steel toed boots hard hat safety glasses nitrile gloves	Modified Level D ^a = Level D plus Tyvek coveralls as needed

Notes

^a If the PRP contractors upgrade to Level C SulTRAC employees will exit the immediate work area and continue oversight from a safe distance until sustainable levels in the breathing zone return to below action levels

PAH Polycyclic aromatic hydrocarbon

PCB Polychlorinated biphenyl

VOC Volatile organic compound

The Material Safety Data Sheets (MSDS) (included as Attachment 3 to this HASP) summarize health and safety information for the following hazardous materials that will be brought to the site as laboratory reagents decontamination solutions and sample preservatives

- Hydrochloric acid (HCL)
- Nitric acid (HNO₃)

4.2 PHYSICAL HAZARDS

Physical hazards associated with site activities present a potential threat to on site personnel. Dangers are posed by heavy equipment, utility and power lines, slippery surfaces, unseen obstacles, noise, heat, cold, and poor illumination.

Injuries may result, for example, from the following:

- Accidents caused by slipping, tripping, or falling
- Use of improper lifting techniques
- Moving or rotating equipment
- Equipment mobilization and operation (such as electrocution from contact with overhead or underground power lines)
- Improperly maintained equipment

Injuries resulting from physical hazards can be avoided by using safe work practices (SWP) and employing caution when working with machinery. Specific SWPs applicable to the Plainwell Mill Site are listed in Section 9.5 and are provided in Appendix B of this HASP. To ensure a safe workplace, the SSC will conduct and document regular safety inspections and will make sure that all SulTRAC workers and visitors are informed of any potential physical hazards related to the site. Physical hazards that have been identified at this site include the following:

- Heat stress
- Cold stress

5 0 TRAINING REQUIREMENTS

All on site SulTRAC personnel who may be exposed to hazardous conditions including SulTRAC and subcontractor personnel and site SulTRAC visitors who will participate in on site activities will be required to meet training requirements outlined in 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response. Specifically, personnel will be required to have HAZWOPER 40 hour with supplemental 8 hour refreshers (if applicable), CPR, and First Aid training. All personnel and visitors entering the site will be required to review this HASP and sign the Compliance Agreement form (HSP 4) and site workers will be required to sign the Daily Tailgate Safety Meeting form (HST 2) (see Appendix A). A minimum of two persons with appropriate training and medical surveillance must be onsite for any fieldwork. Since SulTRAC anticipates only one representative will be onsite during field activities, the second person may be the PRP with appropriate training and medical surveillance.

Before on site activities begin, the SulTRAC SSC will present a briefing for all SulTRAC personnel who will participate in on site activities. The following topics will be addressed during the pre work briefing:

- Names of the SSC and the designated alternate
- Site history
- Work tasks
- Hazardous chemicals that may be encountered on site
- Physical hazards that may be encountered on site
- PPE including type or types of respiratory protection to be used for work tasks
- Training requirements
- Environmental surveillance (air monitoring) equipment use and maintenance
- Action levels and situations requiring upgrade or downgrade of level of protection
- Site control measures including site communications, control zones, and SWPs
- Decontamination procedures
- Emergency communication signals and codes
- Environmental accident emergency procedures (in case contamination spreads outside the exclusion zone)

- Personnel exposure and accident emergency procedures (in case of falls exposure to hazardous substances and other hazardous situations)
- Fire and explosion emergency procedures
- Emergency telephone numbers
- Emergency routes

Any other health and safety related issues that may arise before on site activities begin will also be discussed during the pre work briefing

Issues that arise during implementation of on site activities will be addressed during tailgate safety meetings to be held daily before the workday or shift begins and will be documented in the Daily Tailgate Safety Meeting form (Form HST 2 in Appendix A) or field logbook Any changes in procedures or site specific health and safety related matters will be addressed during these meetings

6 0 PERSONAL PROTECTION REQUIREMENTS

The levels of personal protection to be used for work tasks at the Plainwell Mill Site have been selected based on known or anticipated physical hazards types and concentrations of contaminants that may be encountered on site and contaminant properties toxicity exposure routes and matrices The following sections describe protective equipment and clothing reassessment of protection levels limitations of protective clothing and respirator selection use and maintenance

6 1 PROTECTIVE EQUIPMENT AND CLOTHING

Personnel will wear protective equipment when (1) site activities involve known or suspected atmospheric contamination (2) site activities may generate vapors gases or particulates or (3) direct contact with hazardous materials may occur The anticipated levels of protection selected for use by field personnel during site activities are listed in Table 2 Task Hazard Analysis Based on the anticipated hazard level personnel will initially perform field tasks in Level D protection If site conditions or the results of air monitoring performed during on site activities warrant a higher level of respiratory protection all SulTRAC field personnel will step back from the immediate area until sustainable readings in the breathing zone return to below action levels If the situation becomes necessary for the PRP contractor to perform extended work in Level C SulTRAC field personnel will immediately notify the

SulTRAC project manager and SSC and wait for further instructions. At that point, it may be necessary to amend the HASP and make provisions for Level C oversight. For completeness, descriptions of equipment and clothing required for Level D, Level C, and Level B protection are provided below.

- Level D
 - Coveralls or work clothes, if applicable
 - Chemical resistant clothing (such as Tyvek® or Saranex® coveralls)(optional)
 - Outer gloves (neoprene, nitrile, or other), if applicable
 - Disposable inner gloves (such as latex or vinyl)(optional)
 - Boots with steel toe protection and steel shanks
 - Disposable boot covers or chemical resistant outer boots (optional)
 - Safety glasses or goggles
 - Hard hat (face shield optional)
 - Hearing protection (for areas with a noise level exceeding 85 decibels on the A weighted scale)
- Level C
 - Coveralls or work clothes, if applicable
 - Chemical resistant clothing (such as Tyvek® or Saranex® coveralls)
 - Outer gloves (neoprene, nitrile, or other), if applicable
 - Disposable inner gloves (latex or vinyl)
 - Boots with steel toe protection and steel shanks
 - Disposable boot covers or chemical resistant outer boots
 - Full face air purifying respirator with National Institute for Occupational Safety and Health (NIOSH) approved cartridges to protect against organic vapors, dust, fumes, and mists (cartridges used for gas and vapors must be replaced in accordance with the change out schedule described in the Respiratory Hazard Assessment form [Form RP 2] in Appendix C)
 - Safety glasses
 - Hard hat (face shield optional)

- Hearing protection (for areas with a noise level exceeding 85 decibels on the A weighted scale)
- Level B
 - Chemical resistant clothing (such as Tyvek® or Saranex® coveralls)
 - Outer gloves (neoprene nitrile or other)
 - Disposable inner gloves (latex or vinyl)
 - Boots with steel toe protection and steel shanks
 - Disposable boot covers or chemical resistant outer boots
 - NIOSH approved pressure demand airline respirator with a 5 minute escape cylinder or self contained breathing apparatus (SCBA)
 - Hard hat (face shield optional)
 - Hearing protection (for areas with a noise level exceeding 85 decibels on the A weighted scale)

6 2 REASSESSMENT OF PROTECTION LEVELS

PPE levels shall be upgraded or downgraded based on a change in site conditions or investigation findings. When a significant change in site conditions occurs, hazards will be reassessed. Some indicators of the need for reassessment are as follows:

- Commencement of a new work phase, such as the start of a significantly different sampling activity or work that begins on a different portion of the site
- A change in job tasks during a work phase
- A change of season or weather
- Temperature extremes or individual medical considerations limiting the effectiveness of PPE
- Discovery of contaminants other than those previously identified
- A change in ambient levels of airborne contaminants (see the action levels listed in Table 3)
- A change in work scope that affects the degree of contact with contaminated media

PPE clothing ensembles designated for use during site activities have been selected to provide protection against contaminants at known or anticipated on site concentrations and physical states. However, no protective garment, glove, or boot is entirely chemical resistant, nor does any protective clothing provide protection against all types of chemicals. Permeation of a given chemical through PPE depends on the contaminant concentration, environmental conditions, physical condition of the protective garment, and resistance of the garment to the specific contaminant. Chemical permeation may continue even after the source of contamination has been removed from the garment.

All site personnel will use the following procedures to obtain optimum performance from PPE:

- When chemical protective coveralls become contaminated, don a new, clean garment after each rest break or at the beginning of each shift.
- Inspect all clothing, gloves, and boots both before and during use for the following:
 - Imperfect seams
 - Nonuniform coatings
 - Tears
 - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both before and during use for visible signs of chemical permeation, such as the following:
 - Swelling
 - Discoloration
 - Stiffness
 - Brittleness
 - Cracks
 - Any sign of puncture
 - Any sign of abrasion

Reusable gloves boots or coveralls exhibiting any of the characteristics listed above must be discarded Reusable PPE will be decontaminated in accordance with procedures described in Section 10.0 and will be neatly stored in the support zone away from work zones

6.4 RESPIRATOR SELECTION, USE, AND MAINTENANCE

As noted in Section 6.1 SulTRAC expects to conduct field oversight activities in Level D protection However for completeness a discussion regarding upgraded respiratory protection is provided below

SulTRAC and subcontractor personnel will be informed of the proper use maintenance and limitations of respirators during annual health and safety refresher training and the prework briefing Any on site personnel who will use a tight-fitting respirator must pass a qualitative fit test for the respirator that follows the fit testing protocol provided in Appendix A of the OSHA respirator standard (29 CFR 1910.134) Fit testing must be repeated annually or when a new type of respirator is used

Respirator selection is based on the assessment of the nature and extent of hazardous atmospheres anticipated during field activities This assessment includes a reasonable estimate of employee exposure to respiratory hazards and identification of each contaminant's anticipated chemical form and physical state

For each conducted work task requiring respirator use at the Plainwell Mill Site a respiratory hazard assessment will be conducted The results of this assessment will be documented in the Respiratory Hazard Assessment form (Form RP-2) which has been approved by the HSR The Form RP-2 is included in Appendix C and defines respiratory protection requirements for the project Amendments to this HASP and to Form RP-2 will be discussed during daily tailgate safety meetings

When the atmospheric contaminant is an identified gas or vapor and its concentration is known or can be reasonably estimated respiratory protection options include the following

- An atmosphere supplying respirator (air line or SCBA)
- An air purifying respirator equipped with a NIOSH certified end of service life indicator (ESLI) for the identified contaminant If no ESLI is available a change out schedule for cartridges must be developed based on objective data or information Respirator cartridge selection and change out schedules will be evaluated by the HSR at the time of the respiratory hazard assessment The Respiratory Hazard Assessment

Form RP 2 will describe the information and data used as the basis for the cartridge change out schedule and the proposed change schedule

For protection against particulate contaminants approved respirators can include the following

- An atmosphere supplying respirator
- A respirator equipped with a filter certified by NIOSH under 32 CFR Part 11 or 42 CFR Part 84 as a P100 filter (formerly known as a high efficiency particulate air [HEPA] filter)

For any tasks performed in Level C PPE a full face air purifying respirator equipped with NIOSH approved cartridges or filters will be selected to protect against vapors gases and aerosols

Air purifying respirators will be used only in conjunction with breathing space air monitoring which must be conducted in adherence to the action levels outlined in Table 3 Air purifying respirators will be used only when they can provide protection against the substances encountered on site

Factors precluding use of Level C and air purifying respirators are as follows

- Oxygen deficient atmosphere (less than 19.5 percent oxygen)
- Concentrations of substances that may be immediately dangerous to life and health
- Confined or unventilated areas that may contain airborne contaminants not yet characterized
- Unknown contaminant concentrations or concentrations that may exceed the maximum use levels for designated cartridges documented in the selected cartridge manufacturer's instructions
- Unidentified contaminants
- High relative humidity (more than 85 percent which reduces the sorbent life of the cartridges)
- Respirator cartridges with an undetermined service life

Use, cleaning, and maintenance of respirators are described in SWP 6.27 Respirator Cleaning Procedures and SWP 6.28 Safe Work Practices for Use of Respirators. These SWPs are included in Appendix B.

7 0 MEDICAL SURVEILLANCE

The following sections describe SulTRAC s medical surveillance program including health monitoring requirements site specific medical monitoring and medical support and follow up requirements Procedures documented in these sections will be followed for all activities at the Plainwell Mill Site Additional requirements are defined in the Tetra Tech Health and Safety Manual (Tetra Tech 1999)

7 1 HEALTH MONITORING REQUIREMENTS

All SulTRAC and subcontractor personnel involved in on site activities at the Plainwell Mill Site must participate in a health monitoring program as required by 29 CFR 1910.120(f) Tetra Tech has established a health monitoring program with WorkCare Inc of Orange California Sullivan International Group has established a health monitoring program with University of Illinois at Chicago – Occupational Health Service Institute Under this program SulTRAC personnel receive baseline and annual or biennial physical examinations consisting of the following

- Complete medical and work history
- Physical examination
- Vision screening
- Audiometric screening
- Pulmonary function test
- Resting electrocardiogram
- Chest x ray (required once every 3 years)
- Blood chemistry including hematology and serum
- Urinalysis

For each employee SulTRAC receives a copy of the examining physician s written opinion after post examination laboratory tests have been completed the SulTRAC employee also receives a copy of the written opinion This opinion includes the following information (in accordance with 29 CFR 1910.120[f][7])

- The results of the medical examination and tests

- The physician's opinion as to whether the employee has any medical conditions that would place the employee at an increased risk of health impairment from work involving hazardous waste operations or during an emergency response
- The physician's recommended limitations, if any, on the employee's assigned work; special emphasis is placed on fitness for duty, including the ability to wear any required PPE under conditions expected on site (for example, temperature extremes)
- A statement that the employee has been informed by the physician of the medical examination results and of any medical conditions that require further examination or treatment

Any SulTRAC subcontractors must have health monitoring programs conducted by their own clinics in compliance with 29 CFR 1910.120(f). Any SulTRAC visitor or observer at the site will be required to provide records in compliance with 29 CFR 1910.120(f) before entering the site.

7.2 SITE SPECIFIC MEDICAL MONITORING

There are no site-specific medical monitoring requirements for the site.

7.3 MEDICAL SUPPORT AND FOLLOW-UP REQUIREMENTS

As a follow-up to an injury requiring care beyond basic first aid or to possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Such injuries and exposures must be reported to the HSR. Depending on the type of injury or exposure, follow-up testing, if required, must be performed within 24 to 48 hours of the incident. It will be the responsibility of the employer's medical consultant to advise the type of test required to accurately monitor for exposure effects. The Accident and Illness Investigation Report (Form IR in Appendix A) must be completed by the SulTRAC SSC in the event of an accident, illness, or injury. A copy of this form must be forwarded to the HSR for use in determining the recordability of the incident and for inclusion in SulTRAC's medical surveillance records.

8.0 ENVIRONMENTAL MONITORING AND SAMPLING

Environmental monitoring or sampling will be conducted to assess personnel exposure levels, as well as site or ambient conditions, and to determine appropriate levels of PPE for work tasks. It is the responsibility of the PRP contractor to conduct air monitoring at the site during the field investigation.

As a result the PRP will also be responsible for regular maintenance and calibration of the air monitoring instruments. Air monitoring requirements will be identified in the PRP HASP and SulTRAC oversight personnel will comply with these requirements. As stated in Section 6.0 of this HASP, SulTRAC personnel will not upgrade to Level C unless a HASP amendment is prepared first. The following sections discuss the expected level of initial and background air monitoring, ambient air monitoring, monitoring parameters and devices, and thermal stress monitoring. Site specific air monitoring requirements and action levels are provided in Table 3.

8.1 INITIAL AND BACKGROUND AIR MONITORING

Initial air monitoring of the work area may be performed by the PRP before a work task begins. This monitoring will be performed using real time field survey instrumentation. Air may also be monitored at the beginning of each workday to identify any potentially hazardous situation that might have developed during off shift periods.

Operations at the site may result in variable background levels of airborne compounds. Airborne compounds may be released from vehicles, blowing dust, material transfers, and so on. These sources can complicate evaluation of contaminant emissions during project tasks. Therefore, several upwind and prework measurements may be taken by the PRP to assess contributions to airborne contamination by other potential sources.

TABLE 3

SITE-SPECIFIC AIR MONITORING REQUIREMENTS AND ACTION LEVELS

Air monitoring will be conducted on site by the PRP contractor. However, if the PRP contractor's data are not available, SulTRAC personnel will implement the program shown below.

Action levels in this table are from EPA's Standard Operating Safety Guide, dated June 1992.

Action levels for organic vapors apply to situations where the identity of the vapor or gas constituents are unknown.

Contaminant or Hazard	Task	Monitoring Device	Action Level	Monitoring Frequency	Action
Organic vapors	Oversite/sampling	PID	Background to 5 ppm	Every 30 to 60 minutes	Use Level D PPE
			5 to 55 ppm	Every 30 minutes	SulTRAC does not plan on upgrading to level C for oversight. If it turns out that the PRP contractor is required to do a significant portion of the investigation in level C, SulTRAC will amend the HASP and make all necessary arrangements for level C oversight.
			> 55 ppm	NA	Stop work and evacuate area, implement vapor suppression controls.
Combustible atmosphere		CGI	<10% LEL	Continuous	Continue work
			10 to 25% LEL		Continue work with extreme caution
			>25% LEL		Stop work, evacuate area, and evaluate source.
Particulates		Particulate monitor	<5 mg/m ³	Hourly or more frequent, as determined by SSC	Use Level D PPE
			5 to 10 mg/m ³	Continuous	SulTRAC does not plan on upgrading to level C for oversight. However, if the PRP contractor is required to do a significant portion of the investigation in level C, SulTRAC will amend the HASP and make all necessary arrangements for level C oversight.
			>10 mg/m ³	NA	Stop work and implement dust suppression activities.

TABLE 3 (Continued)

SITE-SPECIFIC AIR MONITORING REQUIREMENTS AND ACTION LEVELS

Notes

CGI	Combustible gas indicator	PID	Photoionization detector
LEL	Lower explosive limit	PPE	Personal protective equipment
mg/m ³	Milligrams per cubic meter	ppm	Parts per million
NA	Not applicable	SSC	Site Safety Coordinator
PEL	Permissible exposure limit		

Refer to Table 4-2 for specific types of gloves, chemical resistant clothing, respirators, and cartridges

8 2 AMBIENT AIR MONITORING

Most tasks may require the PRP contractor to monitor the general work area or ambient site conditions. Ambient monitoring will generally be conducted using direct reading survey instrumentation or compound specific instruments or detector tubes.

Initial ambient air monitoring will be performed as a minimum requirement when any of the following situations arise:

- Work begins on a different portion of the site
- Contaminants other than those previously identified are encountered
- A different type of operation is initiated (for example, well installation is initiated after drilling activities)
- Workers handle leaking containers or work in areas with obvious liquid contamination (for example, spill or lagoon areas)
- Obvious lithologic changes are noticed during drilling activities
- Workers experience physical difficulties

Periodic ambient air monitoring will be performed at the frequency listed in Table 3.

8 3 MONITORING PARAMETERS AND DEVICES

The following sections briefly describe uses and limitations of instruments utilized to monitor for organic vapors, PCBs, metals, combustible atmosphere, percent oxygen, external exposure to radiation, and particulates. Site specific air monitoring requirements and action levels are listed in Table 3. The PRP contractor will be responsible for monitoring the work area and adhering to action levels.

8 3 1 Organic Vapors

A direct reading organic vapor monitor, photoionization detector (PID), will be used to determine the presence of volatile organic compounds (VOC). Table 3 specifies the instrument that will be used for the project. The concentrations of individual VOCs of concern cannot usually be determined using the instrument because the detector responds to the total VOC mixture.

8 3 2 Combustible Atmospheres

When a flammable compound reaches a certain concentration in air it can become explosive when exposed to an ignition source. The lowest concentration able to support combustion is known as the lower explosive limit (LEL). Each flammable compound has its own LEL. Monitoring indicates how close to this limit is the airborne concentration of a flammable compound. SulTRAC will cease activities when the airborne concentration of any flammable vapor or gas reaches 25 percent of its LEL. The monitoring device, monitoring frequency, and general action levels for combustible atmospheres during site activities are outlined in Table 3.

8 3 3 Particulates

Aerosols are a group of airborne materials that include particulates, fumes, mists, and smoke. Particulates are the primary aerosol of concern at hazardous waste sites. If climatic conditions, surface soil conditions, or site operations (such as excavation activities) adversely impact ambient air quality by increasing particulate matter for extended periods of time, air monitoring using a direct reading instrument for particulates may become necessary.

Generally, particulate monitors are capable of measuring both solid and liquid particulates within the size range of 0.1 to 10 micrometers (the respirable range). A monitor indicates the concentration of these particulates in units of milligrams per cubic meter (mg/m^3) of air.

Action levels for particulates will be based on the type of dust and hazardous materials that may contribute to the composition of the particulates, and will be determined with the assistance of the PRP contractor. Table 3 lists the monitoring device, monitoring frequency, and general action levels expected to be used during site activities.

8 4 THERMAL STRESS MONITORING

Heat stress and cold stress are common and serious threats at hazardous waste sites. SWPs 6.15 and 6.16 discuss heat and cold stress, respectively, and include monitoring methods appropriate for the season and location of work (see Appendix B).

9 0 SITE CONTROL

Plainwell Mill Site control is an essential component in HASP implementation. The PRP contractor is responsible for overall site control during all field activities. The following sections discuss measures and procedures for site control such as on site communications, site control zones, site access control, site safety inspections, and SWPs as they pertain to SulTRAC oversight personnel.

9 1 ON SITE COMMUNICATIONS

Successful communication between field teams and personnel in the support zone is essential. The following communication systems will be available during site activities:

- Cellular telephones

The hand signals listed below will be used by site personnel in emergency situations or when verbal communication is difficult.

<u>Signal</u>	<u>Definition</u>
Hands clutching throat	Out of air or cannot breathe
Hands on top of head	Need assistance
Thumbs up	Okay I am all right or I understand
Thumbs down	No or negative
Arms waving upright	Send backup support
Gripping partner's wrist	Exit area immediately

9 2 SITE CONTROL ZONES

To control the spread of contamination and employee exposures to chemical and physical hazards, on-site work areas may be divided into an exclusion zone, a decontamination zone, and a support zone. SulTRAC oversight personnel will comply with all work zones established by the PRP contractor. Any SulTRAC visitors to these areas must present proper identification and be authorized to be on-site. The SulTRAC SSC will identify work areas that SulTRAC visitors or personnel are authorized to enter and will enforce site control measures.

The following sections describe the exclusion zone the decontamination zone and the support zone as well as procedures to be followed in each

9 2 1 Zone 1 Exclusion Zone

The PRP will establish the exclusion zone. An exclusion zone includes areas where contamination is either known or likely to be present or because of work activity has the potential to cause harm to personnel. The perimeter of the exclusion zone and an appropriate radius around work task areas will be demarcated by a physical barrier such as barricade tape or traffic cones to restrict access. A daily roster with the date of each person's entrance into the exclusion zone, the person's name, signature, and organization, and the time of entry and exit will be kept for all SulTRAC personnel working in the zone. Eating, drinking, and smoking are prohibited in the exclusion zone. SulTRAC visitors will not be permitted to enter the exclusion zone without proper qualifications, equipment, and SulTRAC SSC authorization. Work tasks that may require establishment of an exclusion zone include the following:

- PRP oversight in contaminated zones
- Split Sampling activities within contaminated work zones

9 2 2 Zone 2 Decontamination Zone

A decontamination zone may not be required for the Plainwell Mill Site. If the PRP determines one is required, the decontamination zone will usually contain facilities to decontaminate personnel and portable equipment. A steam cleaning area for decontamination of heavy equipment and vehicles may be established at a location readily accessible from work areas. If established, SulTRAC visitors will not be permitted to enter the decontamination zone without proper qualifications and SulTRAC SSC authorization.

9 2 3 Zone 3 Support Zone

The PRP will be responsible to establishing the support zone on site. A support zone may consist of any uncontaminated and nonhazardous part of the site. The support zone should be situated in an area generally upwind of any exclusion zone whenever possible. SulTRAC's site visitors not meeting training, medical surveillance, and PPE requirements must stay in the support zone.

9 3 SITE ACCESS CONTROL

The study area at the Plainwell Mill Site is bounded by the Kalamazoo River to the north mill race and commercial properties to the east Allegan Street (M 89) and mixed residential/commercial properties to the south and residential properties and COP Sewage Treatment Plant to the west Access to the site is controlled by fencing which the COP owns and operates

9 4 SITE SAFETY INSPECTIONS

Periodic site safety inspections may be conducted by the SulTRAC SSC to ensure safe work areas and compliance with this HASP Results of any site safety inspections will be recorded in the field logbook or on a Field Audit Checklist (Form AF 1 in Appendix A)

9 5 SAFE WORK PRACTICES

Various SWPs are applicable to the Plainwell Mill Site These SWPs are included in Appendix B to this HASP The following SWPs apply to the site

- SWP 6 1 General Safe Work Practices
- SWP 6 15 Heat Stress
- SWP 6 16 Cold Stress
- SWP 6 17 Biohazards
- SWP 6 27 Respirator Cleaning Procedures
- SWP 6 28 Safe Work Practices for Use of Respirators

10 0 DECONTAMINATION

Decontamination is the process of removing or neutralizing contaminants on personnel or equipment. When properly conducted, decontamination procedures protect workers from contaminants that may have accumulated on PPE, tools, and other equipment. Proper decontamination also prevents transport of potentially harmful materials to uncontaminated areas. The PRP contractor is responsible for decontaminating equipment during all field activities. Personnel and equipment decontamination procedures are described in the following sections as they pertain to SulTRAC oversight personnel.

10 1 PERSONNEL DECONTAMINATION

Personnel decontamination at the site will be limited by using disposable PPE whenever possible. Any personnel decontamination procedures will follow guidance in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH and others 1985). Personnel and PPE will be decontaminated following procedures specified in the PRP HASP or field sampling plan. Liquid and solid wastes generated during decontamination will be collected by the PRP and drummed.

The decontamination procedures listed below (or similar procedures specified by the PRP contractor) will be conducted if personnel decontamination is required.

- Wash neoprene boots or disposable booties with a Liquinox® or Alconox® solution and rinse them with water. Remove and retain neoprene boots for reuse if possible. Place disposable booties in plastic bags for disposal.
- Wash outer gloves in a Liquinox® or Alconox® solution and rinse them in water. Remove outer gloves and place them in a plastic bag for disposal.
- Remove chemical resistant clothing and place it in a plastic bag for disposal.
- Remove the air purifying respirator if used and place the spent filter in a plastic bag for disposal. The filter must be changed in accordance with the Respiratory Hazard Assessment form (Form RP 2 in Appendix C). Clean and disinfect the respirator in accordance with SWP 6.27 and place it in a plastic bag for storage.
- Remove inner gloves and place them in a plastic bag for disposal.
- Thoroughly wash the hands and face with water and soap.

Used disposable PPE will likely be collected in sealable containers and will be disposed of in accordance with procedures described in the PRP HASP or field sampling plan. Personnel decontamination procedures may be modified as necessary while on site.

10.2 EQUIPMENT DECONTAMINATION

Decontamination of all drilling, sampling, and field monitoring equipment used during site activities will be completed by the PRP contractor. Decontamination of on-site heavy equipment and sampling equipment will follow procedures defined in the site's field sampling plan prepared by the PRP contractor and approved by EPA Region 5.

10.2.1 Heavy Equipment

The PRP contractor will decontaminate heavy equipment, such as drilling and excavating vehicles, in accordance with the site work plan prepared by the PRP and approved by EPA Region 5.

10.2.2 Sampling Equipment

The PRP contractor will decontaminate sampling equipment, such as split spoons, before and after each use as described in the field sampling plan prepared by the PRP and approved by EPA Region 5.

11.0 EMERGENCY RESPONSE PLANNING

This section describes emergency response planning procedures to be implemented for the site. This section is consistent with local, state, and federal disaster and emergency management plans. The following sections discuss pre-emergency planning, personnel roles and lines of authority, emergency recognition and prevention, evacuation routes and procedures, emergency contacts and notifications, hospital route directions, emergency medical treatment procedures, protective equipment failure, fire or explosion, weather-related emergencies, spills or leaks, emergency equipment and facilities, and reporting. The PRP contractor is responsible for implementing the field investigation and making all necessary emergency response plans. The following sections describe emergency planning involvement and awareness requirements as they pertain to SulTRAC oversight personnel.

11 1 PRE EMERGENCY PLANNING

SulTRAC personnel will attend the PRP pre work briefing and daily tailgate safety meetings. All on site SulTRAC employees will be trained in and reminded of the provisions of Section 11 0 site communication systems and site evacuation routes. The emergency response provisions will be reviewed on a regular basis by the SulTRAC SSC. The SulTRAC SCC will notify the PRP if it appears that emergency response procedures are not adequate and consistent with prevailing site conditions.

11 2 PERSONNEL ROLES AND LINES OF AUTHORITY

The SulTRAC SSC has primary responsibility for responding to and correcting emergency situations and for taking appropriate measures to ensure the safety of SulTRAC site personnel. The SulTRAC SCC will coordinate these actions with the PRP's health and safety representative. Possible actions may include evacuation of SulTRAC personnel from the site area.

Individual SulTRAC subcontractors are required to cooperate with the SSC within the parameters of their scopes of work.

SulTRAC personnel are required to report all injuries, illnesses, spills, fires, and property damage to the SSC. The SSC must be notified of any on site emergencies involving SulTRAC personnel and is responsible for ensuring that the appropriate emergency procedures described in this section are followed.

11 3 EMERGENCY RECOGNITION AND PREVENTION

Table 1 lists potential on site chemical hazards and Table 2 provides information on the hazards associated with the different tasks planned for the site. On site SulTRAC personnel will be made familiar with this information and with techniques of hazard recognition through pre work training and site specific briefings.

11 4 EVACUATION ROUTES AND PROCEDURES

In the event of an emergency that necessitates evacuation of a work task area or the site, SulTRAC personnel will coordinate site evacuations with the PRP contractor personnel. It is expected that all personnel will proceed along site roads to a safe distance upwind from the hazard source. The personnel will remain in that area until the SSC or an authorized individual provides further instructions.

11 5 EMERGENCY CONTACTS AND NOTIFICATIONS

The emergency information before Section 1 0 of this HASP provides names office telephone numbers and 24 hour telephone number of emergency contact personnel THIS PAGE MUST BE POSTED ON SITE OR MUST BE READILY AVAILABLE AT ALL TIMES In the event of a medical emergency involving SulTRAC personnel will notify the appropriate emergency organization and will take direction from the SulTRAC SSC In the event of a fire explosion or spill at the site it is expected that the PRP contractor will notify the appropriate local state and federal agencies and will follow procedures discussed in Section 11 9 or 11 11

11 6 HOSPITAL ROUTE DIRECTIONS

Before performing any site activities SulTRAC personnel will conduct a pre emergency hospital run to familiarize themselves with the route to the local hospital A map showing the hospital route is provided in the emergency information before Section 1 0 of this HASP

11 7 EMERGENCY MEDICAL TREATMENT PROCEDURES

A person who becomes ill or injured during work tasks may require decontamination If the illness or injury is minor any decontamination necessary will be completed and first aid should be administered prior to patient transport If the patient s condition is serious partial decontamination will be completed (such as complete disrobing of the person and redressing the person in clean coveralls or wrapping in a blanket) First aid should be administered until an ambulance or paramedics arrive Transportation methods used to travel to the hospital or clinic will depend on the severity of the injury Either a private or ambulance will be used All injuries and illnesses must be reported immediately to the SulTRAC project manager and HSR

Any person transported to a clinic or hospital for chemical exposure treatment will be accompanied by information on the chemical he or she has been exposed to at the site if possible Borgess Pipp Hospital is available to handle a hazardous material accident victim Table 1 contains information on chemicals that personnel may potentially be exposed to onsite •

11 8 PROTECTIVE EQUIPMENT FAILURE

If any SulTRAC worker in the exclusion zone experiences a failure of protective equipment (either engineering controls or PPE) that affects his or her personal protection the worker and all coworkers will immediately leave the exclusion zone. Re entry to the exclusion zone will not be permitted until (1) the protective equipment has been repaired or replaced, (2) the cause of the equipment failure has been determined, and (3) the equipment failure is no longer considered a threat.

11 9 FIRE OR EXPLOSION

In the event of a fire or explosion on site, it is expected that the local fire department will be immediately summoned by the PRP contractor. The PRP site representative (with possible input from SulTRAC personnel) will advise the fire department of the location and nature of any hazardous materials involved. Appropriate provisions of Section 11 0 will be implemented by site personnel.

11 10 WEATHER-RELATED EMERGENCIES

Site work shall not be conducted by SulTRAC during severe weather conditions, including high speed winds or lightning. In the event of severe weather, field oversight personnel will communicate with PRP site personnel and will stop work, secure all equipment, and leave the site.

Thermal stress caused by excessive heat or cold may occur as a result of extreme temperatures, workload, or the PPE used. Heat and cold stress treatment will be administered as described in SWPs 6 15 and 6 16, respectively.

11 11 SPILLS OR LEAKS

The PRP will be responsible for all spills and leaks that may occur at the Plainwell Mill Site. In the event of a severe spill or a leak, SulTRAC site personnel may work with the PRP contractor personnel to implement the procedures listed below:

- Evacuate the affected area and relocate personnel to an upwind location.
- Inform the SulTRAC SSC, a SulTRAC health and safety officer, the SulTRAC project manager, and a site representative immediately.
- Locate the source of the spill or leak and stop the flow if safe to do so.

- Begin containment and recovery of spilled or leaked materials
- Notify appropriate local state and federal agencies

11 12 EMERGENCY EQUIPMENT AND FACILITIES

The PRP will be responsible for providing emergency equipment and facilities location onsite Based on the PRP contractor s emergency response plan the following emergency equipment may be available on site

- First aid kit
- Eye wash (portable)
- Emergency SCBA
- Mobile telephone
- Sorbent material

11 13 REPORTING

All emergency situations require follow up and reporting Appendix A includes the SulTRAC Accident and Illness Investigation Report (Form IR) This report must be completed and submitted to the SulTRAC project manager within 24 hours of an emergency situation The project manager will review the report and then forward it to the SulTRAC HSR for review The report must include proposed actions to prevent similar incidents from occurring The HSR must be fully informed of the corrective action process so that she may implement applicable elements of the process at other sites

REFERENCES

- American Conference of Governmental Industrial Hygienists (ACGIH) No date Threshold Limit Values and Biological Exposure Indices for 2008
- Environmental Protection Agency (EPA) 1992 *Standard Operating Safety Guides* EPA Publication 9285 1 03 June
- National Institute for Occupational Safety and Health (NIOSH) and others 1985 *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* October
- NIOSH 2005 Pocket Guide to Chemical Hazards U S Department of Health and Human Services U S Government Printing Office Washington D C June
- RMT Inc 2008 Initial Groundwater and Coal Tunnel Assessment Operable Unit No 7 of the Allied Paper Inc / Portage Creek/Kalamazoo River Superfund Site October
- Tetra Tech EM Inc (Tetra Tech) 1999 Health and Safety Manual

ATTACHMENT 1
HEALTH AND SAFETY PLAN AMENDMENT
(One Page)



SULTRAC
HEALTH AND SAFETY PLAN AMENDMENT

Site Name Plainwell Mill Site, Plainwell, MI

Amendment Date 7 14 2009

Purpose or Reason for Amendment **Adding an additional task to the HASP Task 3 Site walkthrough of office buildings** **A site walkthrough will be conducted with the PRP to determine if the former office buildings pose any environmental concerns** **Personnel performing the task will follow safety procedures outlined in the attached Job Hazard Analysis for Site Walkthroughs**

Required Additional Safe Work Practices or Activity Hazard Analyses (JHA)	Site Walkthrough Job Hazard

Required Changes in PPE None

Action Level Changes None

AMENDMENT APPROVAL

RSO or Designee	<u>Chris Draper</u>	<u><i>Chris Draper</i></u>	<u>15 July 2009</u>
	Name	Signature	Date

Site Safety Coordinator _____
Name Signature Date

Date presented during daily site safety meeting _____

ATTACHMENT 2

**JOB HAZARD ANALYSIS (JHA)
SITE WALKTHROUGH**

(One Page)



JOB HAZARD ANALYSIS (JHA)

SulTRAC

Site Walkthrough

Task Description

During the performance of Site Walkthrough Tetra Tech EM Inc employees may be faced with several types of hazards This JHA covers the on-site reconnaissance portion of these projects If it is known that a manufacturing facility exists on site larger amounts of chemicals are present or that the work is subject to OSHA 29 CFR 1910.120 requirements (HAZWOPER) this JHA is not appropriate to be used by itself

Hazards		Actions
<u>Task Steps</u>	<u>Potential Hazards</u>	<u>Critical Safety Procedures, PPE, Air Monitoring Required</u>
1 Locate the nearest hospital to the site location		Attach the hospital route map to this JHA and take to the site for reference during on site work If any special allergies (bee stings etc) exist, make sure to denote this on this paperwork
2 Visually assess interior and exterior areas defined in the Site Map	SLIP/TRIP/FALL	Wear boots appropriate to the hazards to be encountered Work in wet areas calls for taller waterproof boots Boot covers should be worn in areas of known or suspected contamination
	CUT	Ensure that a cover for any cutting tool is in place when not in use In wooded areas wear leather gloves
	HEAT	Ensure water is available at all times during the site walkthrough Provide personnel with a cool shaded area to take breaks as needed Take sufficient breaks Wear sunscreen if the potential exists for sunburn
	BIOLOGICAL	Employees with allergies to bee stings etc should have the proper medication with them at all times during reconnaissance operations Carry insect repellent to each jobsite
	STRUCK AGAINST	Walking through wooded areas requires the use of safety glasses at all times due to the high amount of vegetation often encountered Walking along roadways and in woods requires an orange reflective safety vest to increase visibility to hunters and automobiles
	HAZARDOUS CHEMICALS	Observe containers from a safe distance to attempt to determine their contents If large quantities of chemical containers or above-ground/below-ground storage tanks are observed and identification from a distance is not possible retreat from the site and obtain additional guidance from your Tt Project Manager and/or OHSR If drums or other containers of hazardous chemicals either labeled or unlabeled are discovered in an enclosed space do not operate radio or cellular phones in the space
	OVERHEAD HAZARDS	Hardhats and safety glasses must be worn at all times when overhead or potential head and face hazards are present

ATTACHMENT 3
MATERIAL SAFETY DATA SHEETS

(Ten Sheets)

- HCL
- HNO₃



Material Safety Data Sheet (MSDS-HCL)

PRODUCT IDENTIFICATION	
Product Name	Hydrochloric Acid Solution 20 Deg Be – 31 5% 22 Deg Be – 35 2%
Trade Names and Synonyms	Hydrogen Chloride (Aqueous) Muriatic Acid
Manufacturer/Distributor	Trans Chem Inc 1415 Mengel Road Baton Rouge Louisiana 70807 (504) 355 9977 Various others
Transportation Emergency	800 255-3924 (24 hrs – CHEM TEL)

HAZARDOUS COMPONENTS			
Material or Component	CAS No	TLV	PEL
Hydrochloric Acid	7647 01 0	7mg/m ³	5PPM
N/A = Not assigned NE = Not established			

PHYSICAL DATA	
Boiling Point	127 F
Vapor Pressure	24mm Hg – 20 Deg Be 100mm Hg – 22 Deg Be
Solubility in Water	Complete
Specific Gravity	1 16 @ 15 5 C 20 Deg Be 1 1789 @ 15 5 C 22 Deg Be
Melting Point	N/A
Vapor Density	Similar to Water
Evaporation Rate	Not Applicable
Appearance and Odor	Clear Colorless to Yellowish Fuming Liquid Pungent and Irritating

HAZARDOUS REACTIVITY	
Stable under ordinary conditions of use and storage Does not polymerize Incompatible with aluminum and aluminum alloys carbon steel copper and copper alloys and nylon Hydrogen gas will be formed if acid contacts metal	

FIRE AND EXPLOSION DATA	
Flashpoint	Not Flammable
Extinguishing Media	Use any means suitable for extinguishing surrounding fire
Decomposition Products	Contact with most metals may produce Hydrogen gas to potentially explosive limits
Unusual Explosion	Containers may explode when heated Consult the 2000 Emergency Response Guidebook Guide 157 for further details

HEALTH HAZARDS / FIRST AID	
Inhalation	Inhalation causes severe irritation of upper respiratory tract FA Remove person to to fresh air If not breathing, give artificial respiration Call physician
Ingestion	CORROSIVE I Ingestion of Hydrochloric Acid can cause burns of the mouth throat esophagus and gastrointestinal tract FA DO NOT INDUCE VOMITING Give large quantities of water or milk of magnesia Never give anything by mouth to an unconscious person Get immediate medical attention
Skin Contact	CORROSIVE I Can cause redness pain and skin burns Can cause some tissue destruction FA Immediately flush with water
Eye Contact	CORROSIVE I FA Continuously flush eyes with large amounts of water for at least 20 minutes If irritation continues seek medical attention

SPILL OR LEAK PROCEDURES	
Spill/leak	In the event of a spill or leak keep upwind Ventilate enclosed areas until spill or leak is contained, neutralized and prepared for removal
Waste disposal	Disposal of waste material or residue may be subject to federal state or local regulation Before transporting waste material see 49 CFR 172

SPECIAL PROTECTION INFORMATION	
Ventilation	Use only in areas with adequate ventilation
Eye Protection	Use chemical safety goggles plus a safety shield is recommended Contact lenses should not be worn when working with this material
Skin Protection	Wear impervious protective clothing i.e Boots Gloves Lab Coat Apron or Coveralls to prevent skin contact
Other	If working in an area of potential exposure use an NIOSH approved respirator when material is fuming and exceeds the TLV

STORAGE CONDITIONS	
Store and handle only in containers suitably lined with or constructed of materials specified by the manufacturer for the product Protect against physical damage Keep separated from incompatible materials	

REGULATORY INFORMATION	
Proper shipping name	Hydrochloric acid
Hazard class	8
UN Number	UN1789
DOT Label & Placard	Corrosive
NFPA / HMIS Ratings	Health - 3 Flammability - 0 Reactivity - 0
SARA Title III	Reporting Sections 302 311 & 313

The information contained in this Material Safety Data Sheet is based upon available data and believed to be correct however as such has been obtained from various sources including the manufacturer and independent laboratories it is given without warranty or representation that it is complete accurate and can be relied upon *OWEN COMPLIANCE SERVICES, INC.* has not attempted to conceal in any manner the deleterious aspects of the product listed herein but makes no warranty as to such Further *OWEN COMPLIANCE SERVICES, INC.* cannot anticipate nor control the many situations in which the product or this information may be used there is no guarantee that the health and safety precautions suggested will be proper under all conditions It is the sole responsibility of each user of the product to determine and comply with the requirements of all applicable laws and regulations regarding its use This information is given solely for the purposes of safety to persons and property Any other use of this information is expressly prohibited

For further information contact

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Fort Worth TX 76140
Telephone number
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817 551 0660
817 551 1032

MSDS prepared by

Allen M Sweeney
Original publication date
Revision date

8/5/1999
11/2/00

MSDS Number **N3659** * * * * * Effective Date **11/02/01** * * * * * Supersedes **10/15/99**

NITRIC ACID 1 0 N AND 2 0 N VOLUMETRIC SOLUTIONS

1 Product Identification

Synonyms Azotic acid solution nitric acid 6 3% nitric acid 1 0 N volumetric solution nitric acid 2 0 N volumetric solution nitric acid 12 6%

CAS No 7697 37 2

Molecular Weight 63 00

Chemical Formula HNO₃ in H₂O

Product Codes

J T Baker 5639

Mallinckrodt 3510

2 Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	-----
Nitric Acid	7697-37-2	6 - 13%	Yes
Water	7732-18-5	> 87%	No

3 Hazards Identification

Emergency Overview

- - -

**POISON' DANGER' OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE
CORROSIVE LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE MAY BE FATAL IF
SWALLOWED HARMFUL IF INHALED INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE**

J T Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

- - - -

Health Rating 3 - Severe (Poison)

Flammability Rating 0 None

Reactivity Rating 3 Severe (Oxidizer)

Contact Rating 4 Extreme (Corrosive)

Lab Protective Equip GOGGLES & SHIELD LAB COAT & APRON VENT HOOD PROPER GLOVES

Storage Color Code Yellow (Reactive)

Potential Health Effects

Nitric acid is extremely hazardous it is corrosive reactive an oxidizer and a poison

Inhalation

Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema which may be fatal Other symptoms may include coughing choking and irritation of the nose throat and respiratory tract

Ingestion

Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth throat esophagus and gastrointestinal tract

Skin Contact

Corrosive! Can cause redness pain and severe skin burns Concentrated solutions cause deep ulcers and stain skin a yellow or yellow brown color

Eye Contact

Corrosive! Vapors are irritating and may cause damage to the eyes Contact may cause severe burns and permanent eye damage

Chronic Exposure

Long term exposure to concentrated vapors may cause erosion of teeth and lung damage Long term exposures seldom occur due to the corrosive properties of the acid

Aggravation of Pre-existing Conditions

Persons with pre existing skin disorders eye disease or cardiopulmonary diseases may be more susceptible to the effects of this substance

4 First Aid Measures

Immediate first aid treatment reduces the health effects of this substance

Inhalation

Remove to fresh air If not breathing give artificial respiration If breathing is difficult, give oxygen Call a physician

Ingestion

DO NOT INDUCE VOMITING! Give large quantities of water or milk if available Never give anything by mouth to an unconscious person Get medical attention immediately

Skin Contact

In case of contact immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes Wash clothing before reuse Thoroughly clean shoes before reuse Get medical attention immediately

Eye Contact

Immediately flush eyes with plenty of water for at least 15 minutes lifting lower and upper eyelids occasionally Get medical attention immediately

5 Fire Fighting Measures

Fire

Not combustible but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition Can react with metals to release flammable hydrogen gas

Explosion

May react explosively with combustible organic or readily oxidizable materials such as alcohols turpentine charcoal

organic refuse metal powder hydrogen sulfide etc

Fire Extinguishing Media

If involved in a fire use water spray

Special Information

Increases the flammability of combustible organic and readily oxidizable materials In the event of a fire wear full protective clothing and NIOSH approved self contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode

6 Accidental Release Measures

Ventilate area of leak or spill Wear appropriate personal protective equipment as specified in Section 8 Isolate hazard area Keep unnecessary and unprotected personnel from entering Contain and recover liquid when possible Neutralize with alkaline material (soda ash lime) then absorb with an inert material (e g vermiculite dry sand earth) and place in a chemical waste container Do not use combustible materials such as saw dust Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil water and air in excess of reportable quantities The toll free number for the US Coast Guard National Response Center is (800) 424 8802

J T Baker NEUTRASORB® or TEAM® Low Na⁺ acid neutralizers are recommended for spills of this product

7 Handling and Storage

Keep in a tightly closed container stored in a cool dry ventilated area Protect from physical damage and direct sunlight Isolate from incompatible substances Containers of this material may be hazardous when empty since they retain product residues (vapors liquid) observe all warnings and precautions listed for the product

8 Exposure Controls/Personal Protection

Airborne Exposure Limits

For Nitric Acid

OSHA Permissible Exposure Limit (PEL)

2 ppm (TWA)

ACGIH Threshold Limit Value (TLV)

2 ppm (TWA) 4 ppm (STEL)

Ventilation System

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source preventing dispersion of it into the general work area Please refer to the ACGIH document *Industrial Ventilation A Manual of Recommended Practices* most recent edition for details

Personal Respirators (NIOSH Approved)

If the exposure limit is exceeded and engineering controls are not feasible wear a supplied air full facepiece respirator airtight hood or full facepiece self contained breathing apparatus Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134) Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials such as activated charcoal Canister type respirators using sorbents are ineffective

Skin Protection

Wear impervious protective clothing including boots gloves lab coat apron or coveralls as appropriate to prevent

skin contact

Eye Protection

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick drench facilities in work area.

9 Physical and Chemical Properties

Appearance

Colorless to yellowish liquid

Odor

Suffocating, acrid

Solubility

Infinitely soluble

Specific Gravity

No information found

pH

No information found

% Volatiles by volume @ 21C (70F)

100 (as water and acid)

Boiling Point

No information found

Melting Point

No information found

Vapor Density (Air=1)

No information found

Vapor Pressure (mm Hg)

No information found

Evaporation Rate (BuAc=1)

No information found

10 Stability and Reactivity

Stability

Stable under ordinary conditions of use and storage. Containers may burst when heated.

Hazardous Decomposition Products

When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate.

Hazardous Polymerization

Will not occur.

Incompatibilities

A dangerously powerful oxidizing agent. Concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.

Conditions to Avoid

Heat and incompatibles

Toxicological Information

For Nitric Acid Investigated as a mutagen and reproductive effector

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

12 Ecological Information

Environmental Fate

No information found

Environmental Toxicity

No information found

13 Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use, or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state, and local requirements.

14 Transport Information

Domestic (Land, D O T)

Proper Shipping Name NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)

Hazard Class 8

UN/NA UN2031

Packing Group II

Information reported for product/size 20L

International (Water, I M.O)

Proper Shipping Name NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)

Hazard Class 8

UN/NA UN2031

Packing Group II

Information reported for product/size 20L

15 Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		Phil
		DSL	NDSL	
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	
		261 33	-TSCA- 8 (d)
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention No TSCA 12(b) No CDTA No
 SARA 311/312 Acute Yes Chronic Yes Fire No Pressure No
 Reactivity Yes (Mixture / Liquid)

Australian Hazchem Code 2PE

Poison Schedule S6

WHMIS

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR

16 Other Information

NFPA Ratings Health 3 Flammability 0 Reactivity 0 Other **Oxidizer**

Label Hazard Warning

POISON! DANGER! OXIDIZER CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE CORROSIVE LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE MAY BE FATAL IF SWALLOWED HARMFUL IF INHALED INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE

Label Precautions

Do not get in eyes on skin or on clothing
 Do not breathe vapor or mist
 Use only with adequate ventilation
 Wash thoroughly after handling

Keep from contact with clothing and other combustible materials

Store in a tightly closed container

Label First Aid

In case of contact immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes Wash clothing before reuse If swallowed DO NOT INDUCE VOMITING Give large quantities of water Never give anything by mouth to an unconscious person If inhaled remove to fresh air If not breathing give artificial respiration If breathing is difficult give oxygen In all cases call a physician

Product Use

Laboratory Reagent

Revision Information

MSDS Section(s) changed since last revision of document include 8

Disclaimer

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Prepared by Environmental Health & Safety

Phone Number (314) 654 1600 (U S A)

APPENDIX A

TETRA TECH EM INC FORMS

(Eight Sheets)

- Compliance Agreement (Form HSP 4)
- Daily Tailgate Safety Meeting (Form HST 2)
- Daily Site Log (Form SSC 1)
- Accident and Illness Investigation Report (Form IR)
- Field Audit Checklist (Form AF 1)



TETRA TECH, INC
HEALTH AND SAFETY PLAN COMPLIANCE AGREEMENT

Project Name _____

Project Number _____

I have read and understand the health and safety plan indicated above and agree to comply with all of its provisions I understand that I could be prohibited from working on the project for violating any of the safety requirements specified in the plan

Name	Signature	Employer	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____



TETRA TECH, INC
DAILY TAILGATE SAFETY MEETING FORM

Date _____ Time _____ Project No _____

Client _____ Site Location _____

Site Activities Planned for Today _____

Safety Topics Discussed
Protective clothing and equipment
Chemical hazards
Physical hazards
Environmental and biohazards
Equipment hazards
Decontamination procedures
Other
Review of emergency procedures
Employee Questions or Comments



TETRA TECH, INC
DAILY TAILGATE SAFETY MEETING FORM (Continued)

Attendees	
Printed Name	Signature

Meeting Conducted by

Name

Title

Signature



TETRA TECH, INC
DAILY SITE LOG

Site Name _____ Date _____

Name (print)	Company	Time	
		In	Out

Comments



TETRA TECH, INC

Safety Excellence

TETRA TECH, INC
INCIDENT REPORT

Report Date	Report Prepared By	Incident Report Number
<p align="center">INSTRUCTIONS:</p> <p>All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form.</p> <p>Complete any additional parts to this form as indicated below for the type of incident selected.</p>		
TYPE OF INCIDENT (Check all that apply)	Additional Form(s) Required for this type of incident	
Near Miss (No losses but could have resulted in injury illness or damage)	<input type="checkbox"/> Complete IR Form Only	
Injury or Illness	<input type="checkbox"/> Complete Form IR A Injury or Illness	
Property or Equipment Damage Fire Spill or Release	<input type="checkbox"/> Complete Form IR B Damage Fire Spill or Release	
Motor Vehicle	<input type="checkbox"/> Complete Form IR C Motor Vehicle	
INFORMATION ABOUT THE INCIDENT		
Description of Incident		
<hr/> <hr/> <hr/> <hr/>		
Date of Incident	Time of Incident	
	_____ AM <input type="checkbox"/> PM <input type="checkbox"/> OR Cannot be determined <input type="checkbox"/>	
Weather conditions at the time of the incident	Was there adequate lighting?	
	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Location of Incident		
Was location of incident within the employer's work environment? Yes <input type="checkbox"/> No <input type="checkbox"/>		
Street Address	City State Zip Code and Country	
<hr/>		
Project Name	Client	
<hr/>		
Tt Supervisor or Project Manager	Was supervisor on the scene?	
	Yes <input type="checkbox"/> No <input type="checkbox"/>	
WITNESS INFORMATION (attach additional sheets if necessary)		
Name	Company	
<hr/>		
Street Address	City State and Zip Code	
<hr/>		
Telephone Number(s)		
<hr/>		



CORRECTIVE ACTIONS

Corrective action(s) immediately taken by unit reporting the incident

Corrective action(s) still to be taken (by whom and when)

ROOT CAUSE ANALYSIS LEVEL REQUIRED

Root Cause Analysis Level Required Level 1 ☐ Level 2 ☐ None ☐

Root Cause Analysis Level Definitions

Level 1	<p>Definition A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews site investigation, witness and affected employee interviews and identify corrective actions Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office</p> <p>The following events may trigger a Level 1 RCA</p> <ul style="list-style-type: none">Work related fatalityHospitalization of one or more employee where injuries result in total or partial permanent disabilityProperty damage in excess of \$75 000When requested by senior management
Level 2	<p>Definition A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided</p> <p>The following events will require a Level 2 RCA</p> <ul style="list-style-type: none">OSHA recordable lost time incidentNear miss incident that could have triggered a Level 1 RCAWhen requested by senior management

Complete the Root Cause Analysis Worksheet and Corrective Action form Identify a corrective action(s) for each root cause identified within each area of inquiry

NOTIFICATIONS

Title	Printed Name	Signature	Telephone Number	Date
Project Manager or Supervisor				
Site Safety Coordinator or Office H&S Representative				
Operating Unit H&S Representative				
Other _____				

The signatures provided above indicate that appropriate personnel have been notified of the incident



TETRA TECH, INC
FIELD AUDIT CHECKLIST

Project Name _____ Project No _____
Field Location _____ Completed by _____
Project Manager _____ Site Safety Coordinator _____

General Items		In Compliance?		
Health and Safety Plan Requirements		Yes	No	NA
1	Approved health and safety plan (HASP) on site or available			
2	Names of on site personnel recorded in field logbook or daily log			
3	HASP compliance agreement form signed by all on site personnel			
4	Material Safety Data Sheets on site or available			
5	Designated site safety coordinator present			
6	Daily tailgate safety meetings conducted and documented			
7	On site personnel meet HASP requirements for medical examinations fit testing and training (including subcontractors)			
8	Compliance with specified safe work practices			
9	Documentation of training medical examinations and fit tests available from employer			
10	Exclusion decontamination and support zones delineated and enforced			
11	Windsock or ribbons in place to indicate wind direction			
12	Illness and injury prevention program reports completed (California only)			
Emergency Planning				
13	Emergency telephone numbers posted			
14	Emergency route to hospital posted			
15	Local emergency providers notified of site activities			
16	Adequate safety equipment inventory available			
17	First aid provider and supplies available			
18	Eyewash stations in place			
Air Monitoring				
19	Monitoring equipment specified in HASP available and in working order			
20	Monitoring equipment calibrated and calibration records available			
21	Personnel know how to operate monitoring equipment and equipment manuals available on site			
23	Environmental and personnel monitoring performed as specified in HASP			



TETRA TECH, INC
FIELD AUDIT CHECKLIST (Continued)

Safety Items		In Compliance?		
		Yes	No	NA
Personal Protection				
1	Splash suit			
2	Chemical protective clothing			
3	Safety glasses or goggles			
4	Gloves			
5	Overboots			
6	Hard hat			
7	Dust mask			
8	Hearing protection			
9	Respirator			
Instrumentation				
10	Combustible gas meter			
11	Oxygen meter			
12	Organic vapor analyzer			
Supplies				
13	Decontamination equipment and supplies			
14	Fire extinguishers			
15	Spill cleanup supplies			
Corrective Action Taken During Audit				
Corrective Action Still Needed				

Note NA = Not applicable

Auditor's Signature

Site Safety Coordinator's Signature

Date

APPENDIX B

TETRA TECH EM INC SAFE WORK PRACTICES

- SWP 6 1 General Safe Work Practices
- SWP 6 15 Heat Stress
- SWP 6 16 Cold Stress
- SWP 6 17 Biohazards
- SWP 6 27 Respirator Cleaning Procedures
- SWP 6 28 Safe Work Practices for Use of Respirators



TETRA TECH, INC
HEALTH AND SAFETY MANUAL
VOLUME III

SAFE WORK PRACTICES (SWP)

GENERAL SAFE WORK PRACTICES

SWP NO 6-1
ISSUE DATE JULY 1998
REVISION NO 1

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swp6 01_general_safe_work_practices.doc

GENERAL SAFE WORK PRACTICES

To prevent injuries and adverse health effects the following general safe work practices (SWP) are to be followed when conducting work involving known and unknown site hazards These SWPs establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations This list is not inclusive and may be amended as necessary

- Do not eat drink chew gum or tobacco take medication or smoke in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs
- Avoid contact with potentially contaminated substances Do not walk through puddles pools mud or other such areas Avoid whenever possible kneeling on the ground or leaning or sitting on drums equipment or the ground Do not place monitoring equipment on potentially contaminated surfaces
- Remove beards or facial hair that interfere with a satisfactory qualitative respirator fit test or routine pre entry positive and negative pressure checks
- Be familiar with and knowledgeable of and adhere to all instructions in the site specific health and safety plan (HASP) At a minimum a safety meeting will be held at the start of each project to discuss the HASP Additional meetings will be held as necessary to address new or continuing safety and health concerns
- Be aware of the location of the nearest telephone and all emergency telephone numbers
- Attend a briefing on the anticipated hazards equipment requirements SWPs emergency procedures and communication methods before going on site
- Plan and delineate entrance exit and emergency escape routes
- Rehearse unfamiliar operations prior to implementation
- Use the buddy system whenever respiratory protection equipment is in use Buddies should establish hand signals or other means of emergency communication in case radios break down or are unavailable
- Buddies should maintain visual contact with each other and with other on site team members by remaining in close proximity in order to assist each other in case of emergency

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- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone) Nonessential vehicles and equipment should remain within the support zone
- Establish appropriate support contamination reduction and exclusion zones
- Establish appropriate decontamination procedures for leaving the site
- Immediately report all injuries illnesses and unsafe conditions practices and equipment to the site safety coordinator (SSC)
- Maintain a portion of the site field logbook as a project safety log The project safety log will be used to record the names entry and exit dates and times on site of all Tetra Tech subcontractor and project site visitor personnel air quality and personal exposure monitoring data and other information related to safety matters Form SSC 1 Daily Site Log may be used to record names of on site personnel
- A portable eyewash station should be located in the support zone if chemical splashes to eyes are possible
- Do not bring matches and lighters in the exclusion zone or contamination reduction zone
- Observe coworkers for signs of toxic exposure and heat or cold stress
- Inform coworkers of nonvisual effects of illness if you experience them such as headaches dizziness nausea, or blurred vision

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VOLUME III

SAFE WORK PRACTICES (SWP)

HEAT STRESS

SWP NO 6-15

ISSUE DATE JULY 1998

REVISION NO 1

REVISION NO 2 (ECORD, JULY 2007)

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swp6-15_heat_stress.doc

HEAT STRESS

This safe work practice (SWP) describes situations where heat stress is likely to occur and provides procedures for the prevention and treatment of heat related injuries and illnesses. Wearing personal protective equipment (PPE) especially during warm weather puts employees at considerable risk of developing heat related illness. Health effects from heat stress may range from transient heat fatigue or rashes to serious illness or death.

Many factors contribute to heat stress including PPE, ambient temperature and humidity, workload, and the physical condition of the employee, as well as predisposing medical conditions. However, the primary factors are elevated ambient temperatures in combination with fluid loss. Because heat stress is one of the more common health concerns that may be encountered during field activities, employees must be familiar with the signs, symptoms, and various treatment methods of each form of heat stress. Heat stroke is the most serious heat related illness—it is a threat to life and has a 20 percent mortality rate. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age directly affect the tendency to heat stroke. Table 1 lists the most serious heat conditions, their causes, signs and symptoms, and treatment.

Training is an important component of heat stress prevention. Employees are instructed to recognize and treat heat related illnesses during 8 hour health and safety refresher and first aid training courses. When working in hot environments, specific steps should be taken to lessen the chances of heat related illnesses. These include the following:

- Ensuring that all employees drink plenty of fluids (Gatorade® or its equivalent)
- Ensuring that frequent breaks are scheduled so overheating does not occur
- Revising work schedules when necessary to take advantage of the cooler parts of the day (such as working from 5 00 a.m. to 11 00 a.m. and 6 00 p.m. to nightfall)

When PPE must be worn (especially Levels A and B), suggested guidelines relating to ambient temperature and maximum wearing time per excursion are as shown in Table 2.

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TABLE 1
HEAT STRESS CONDITIONS

Condition	Causes	Signs and Symptoms	Treatment
Heat cramps	Fluid loss and electrolyte imbalance from dehydration	<ul style="list-style-type: none"> • Painful muscle cramps especially in legs and abdomen • Faintness • Profuse perspiration 	<ul style="list-style-type: none"> • Move affected worker to cool location • Provide sips of liquid such as Gatorade® • Stretch cramped muscles • Transport affected worker to hospital if condition worsens
Heat Exhaustion	Blood transport to skin to dissipate excessive body heat resulting in blood pooling in the skin with inadequate return to the heart	<ul style="list-style-type: none"> • Weak pulse • Rapid and shallow breathing • General weakness • Pale clammy skin • Profuse perspiration • Dizziness • Unconsciousness 	<ul style="list-style-type: none"> • Move affected worker to cool area • Remove as much clothing as possible • Provide sips of cool liquid or Gatorade® (only if conscious) • Fan the person but do not overcool or chill • Treat for shock • Transport to hospital if condition worsens
Heat Stroke	Life threatening condition from profound disturbance of body's heat regulating mechanism	<ul style="list-style-type: none"> • Dry hot and flushed skin • Constricted pupils • Early loss of consciousness • Rapid pulse • Deep breathing at first and then shallow breathing • Muscle twitching leading to convulsions • Body temperature reaching 104 °F or higher 	<ul style="list-style-type: none"> • Immediately transport victim to medical facility • Move victim to cool area • Remove as much clothing as possible • Reduce body heat promptly by dousing with water or wrapping in wet cloth • Place ice packs under arms around neck at ankles and wherever blood vessels are close to skin surface • Protect patient during convulsions

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TABLE 2

SUGGESTED GUIDELINES WHEN WEARING PPE

Ambient Temperature	Maximum PPE Wearing Time per Excursion
Above 90 °F	15 minutes
85 to 90 °F	30 minutes
80 to 85 °F	60 minutes
70 to 80 °F	90 minutes
60 to 70 °F	120 minutes
50 to 60 °F	180 minutes

Source National Institute for Occupational Safety and Health (NIOSH) 1985 Memorandum Regarding Recommended Personal Protective Equipment Wearing Times at Different Temperatures From Austin Henschel To Sheldon Rabinovitz June 20

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To monitor the level of an employee s heat stress the following should be measured

- **Heart Rate** Count the radial (wrist) pulse during a 30 second period as early as possible in the rest period if heart rate exceeds 110 beats per minute at the beginning of the rest period shorten the next work cycle by one third and keep the rest period the same

If the heart rate still exceeds 110 beats per minute at the next period shorten the following work cycle by one third

- **Oral Temperature** Use a disposable oral thermometer (3 minutes under the tongue) to measure the oral temperature at the end of the work period If oral temperature exceeds 99 6 °F (37 6 °C) shorten the next work cycle by one third without changing the rest period If oral temperature still exceeds 99 6 °F at the beginning of the next rest period shorten the following work cycle by one third Do not permit a worker to wear impermeable PPE when his or her oral temperature exceeds 100 6 °F (38 1 °C)

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SAFE WORK PRACTICES (SWP)

COLD STRESS

SWP NO 6-16

ISSUE DATE JULY 1998

REVISION NO 1

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swp6 16_cold_stress.doc

COLD STRESS

This safe work practices (SWP) describes situations where cold stress is likely to occur and discusses procedures for the prevention and treatment of cold related injuries and illnesses. Cold conditions may present health risks to employees during field activities. The two primary factors that influence the risk potential for cold stress are temperature and wind velocity. Wetness can also contribute to cold stress. Other factors that increase susceptibility to cold stress include age (very young or old), smoking, alcohol consumption, fatigue, and wet clothing. Hypothermia can occur at temperatures above freezing if the individual has on wet or damp clothing or is immersed in cold water. The combined effect of temperature and wind can be evaluated using a wind chill index as shown in Table 1.

Bare flesh and body extremities that have high surface area to volume ratios such as fingers, toes, and ears are most susceptible to wind chill or extremely low ambient temperatures. Because cold stress can create the potential for serious injury or death, employees must be familiar with the signs and symptoms and various treatments for each form of cold stress. Table 2 provides information on frostbite and hypothermia, the two most common forms of cold related injuries.

Training is an essential component of cold stress prevention. Employees are instructed to recognize and treat cold related injuries during 8 hour health and safety refresher and first aid training courses. When working in cold environments, specific steps should be taken to lessen the chances of cold related injuries. These include the following:

- Protecting of exposed skin surfaces with appropriate clothing (such as face masks, handwear, and footwear) that insulates, stays dry, and blocks wind.
- Shielding the work area with windbreaks to reduce the cooling effects of wind.
- Providing equipment for keeping workers' hands warm by including warm air jets and radiant heaters in addition to insulated gloves.
- Using adequate insulating clothing to maintain a body core temperature of above 36 °C.
- Providing extra insulating clothing on site.

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TABLE 1

**COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED
AS EQUIVALENT TEMPERATURE**

Estimated Wind Speed (in miles per hour - mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (°F)											
CALM	50	40	30	20	10	0	10	20	30	40	50	60
5	48	37	27	16	6	5	15	26	36	47	57	68
10	40	28	16	4	9	24	33	46	58	70	83	95
15	36	22	9	5	18	32	45	58	72	85	99	112
20	32	18	4	10	25	39	53	67	82	96	110	121
25	30	16	0	15	29	44	59	74	88	104	118	133
30	28	13	2	18	33	48	63	79	94	109	125	140
35	27	11	4	20	35	51	67	82	98	113	129	145
40	26	10	6	21	37	53	69	85	100	116	132	148
(Wind speeds greater than 40 mph have little additional effect)	<i>LITTLE DANGER</i> in less than 1 hour with dry skin maximum danger from false sense of security			<i>INCREASING DANGER</i> from freezing of exposed flesh within 1 minute				<i>GREAT DANGER</i> that flesh may freeze within 30 seconds				

Trench foot may occur at any point on this chart

Source Modified from American Conference of Governmental Industrial Hygienists 1997
Threshold Limit Values for Chemical Substances and Physical Agents

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TABLE 2
COLD STRESS CONDITIONS

Condition	Causes	Signs and Symptoms	Treatment
Frostbite	Freezing of body tissue usually the nose ears chin cheeks fingers or toes	<ul style="list-style-type: none">• Pain in affected area that later goes away• Area feels cold and numb• Incipient frostbite (frostnip) skin is blanched or whitened and feels hard on the surface• Moderate frostbite large blisters• Deep frostbite tissues are cold pale and hard	<ul style="list-style-type: none">• Move affected worker to a warm area• Immerse affected body part in warm (100 to 105 F) water—not hot!• Handle affected area gently do not rub• After warming bandage loosely and seek immediate medical treatment
Hypothermia	Exposure to freezing or rapidly dropping temperatures	<ul style="list-style-type: none">• Shivering dizziness numbness weakness impaired judgment and impaired vision• Apathy listlessness or sleepiness• Loss of consciousness• Decreased pulse and breathing rates• Death	<ul style="list-style-type: none">• Immediately move affected person to warm area• Remove all wet clothing and redress with loose dry clothes• Provide warm sweet drinks or soup (only if conscious)• Seek immediate medical treatment

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- Reducing the duration of exposure to cold ,
- Changing wet or damp clothing as soon as possible

During periods of extreme cold (10 °F or less) workers should use the buddy system to ensure constant protective observation

Specific monitoring criteria are not established for cold stress. However, employees should be thoroughly cognizant of the signs and symptoms of frostbite and hypothermia (see Table 1) in themselves as well as in coworkers. All instances of cold stress should be reported to the site safety coordinator. Work schedules may be adjusted and warm up regimes imposed as needed to deal with temperature and wind conditions.

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SAFE WORK PRACTICES (SWP)

BIOHAZARDS

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swp6 17_biohazards.doc

BIOHAZARDS

Biological hazards or biohazards include plants animals or their products and parasitic or infectious agents that may present potential risks to worker health This safe work practice (SWP) discusses procedures for working with biohazards preventive guidelines and first aid procedures for the most common hazards field staff are likely to encounter This SWP does not address biohazards such as those associated with medical waste Procedures for working with this type of biohazard should be addressed in the site specific health and safety plan (HASP) on a case by case basis

During preparation of the site specific HASP the preparer should consider which plants animals and other biological agents may be encountered assess their potential risk to project personnel and attach this SWP to the HASP if necessary Office health and safety representatives should become familiar with biological hazards indigenous to the geographical area in which most of their office personnel work and assist in evaluating the risks to personnel on projects staffed from their offices SWPs for insects snakes animals plants waterborne pathogens (giardia) and hantavirus are provided below

1 0 INSECTS

SWPs for reducing the chance of insect bites or stings and for treating bites or stings are listed below

- Workers should keep as much skin area covered as possible by wearing long sleeved shirts long pants and a hat Pant legs should be tucked into socks or boots and shirts into pants In addition workers should wear light colored clothing
- A proven insect repellent should be used on bare skin and clothing
- When possible tall grasses and brush that could harbor ticks should be avoided
- Several times during the day and at the end of the work day each worker should perform a check for evidence of imbedded ticks or previous bites Particular attention should be paid to the scalp neck, ankles back of the legs and waist
- When opening well covers vaults or other closed items workers should watch for hornet or wasp nests and black widow or brown recluse spiders Workers should never reach into spaces with unprotected arms
- Workers should watch carefully for bees around open soft drinks or food

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- If a worker is stung by a bee the stinger should be carefully removed if present The wound should be washed and a cold pack applied Allergic reaction should be watched for and is evidenced by extreme swelling redness pain or difficulty breathing
- If a worker is stung or bit by a spider or scorpion medical attention should be obtained immediately

2 0 SNAKES

SWPs for encounters with snakes and for treating snakebites are listed below

- Workers should avoid walking in areas known to harbor snakes Workers should be cautious when picking up or moving items that have been on the ground
- Workers should wear boots made of heavy material that protect the ankles and pants Heavy work gloves should be worn for picking up items
- If one snake is encountered others may be present Workers should leave the area by retracing their steps
- If a worker is bitten the wound should be washed and the injured area immobilized and kept lower than the heart if possible Ice or a tourniquet should not be applied to a snake bite The wound should not be cut If medical care is more than 30 minutes away from a work site a snakebite kit should be available on site and workers should know how to use it

3 0 ANIMALS

SWPs for encounters with animals and for treating associated wounds are listed below

- If workers encounter a wild animal the animal should be observed for unusual behavior such as a nocturnal animal out during the day, drooling an appearance of partial paralysis irritability meanness or a strangely quiet demeanor
- Workers should never touch the body of a dead animal because certain diseases could be carried by fleas still on the body
- Workers should avoid animal droppings (including bird droppings) Pathogens some of which can become airborne may still be present in the droppings
- If a worker is bitten he or she should get away from the animal to avoid further bites Workers should not try to stop hold or catch the animal

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- If the wound is minor it should be washed with soap and water. Any bleeding should then be controlled and an antibiotic ointment and dressing should be applied. All animal bite wounds should be watched for signs of infection.
- If the wound is bleeding seriously the bleeding should be controlled but the wound should not be cleaned. Medical assistance should be summoned immediately.
- If a rabid animal is suspected immediate medical attention should be summoned. If possible workers should try to remember what the rabid animal looked like and the area in which it was last seen. The animal should be reported by calling the local emergency number.

4 0 PLANTS

SWPs for plants are as follows

- Workers should be aware of the types and appearances of poisonous plants in the work site area. Poison ivy, oak, and sumac are the most frequently encountered plants that can cause reaction from casual contact. If a worker is extremely sensitive to these plants, he or she should avoid the area entirely because airborne drift could be sufficient to cause a reaction. Other plants, such as fireweed, can cause painful, short term irritation and should be avoided as well. Workers should avoid touching face and eye areas after contact with any suspicious plant.
- Workers should wear proper clothing if working in or near overgrown areas. Disposable outerwear should be used, if necessary, and workers should not touch the material with bare hands during removal if the outerwear may have contacted poisonous plants.
- If contact with a poisonous plant has occurred, the affected area should be immediately washed thoroughly with soap and water. If a rash or weeping sore has already begun to develop, a paste of baking soda and water should be applied to the area several times a day to reduce discomfort. Lotions such as Calamine or Caladryl should be applied to help soothe the area. If the condition gets worse and affects large areas of the body or the face, a doctor should be consulted.
- Bushy and wooded areas should be thoroughly checked for thorn bearing trees, brush, and bramble. In some cases, impalement can cause severe pain or infection.

5 0 WATERBORNE PATHOGENS-GIARDIA

Giardia is a waterborne pathogen consisting of a protoplasmic parasite of the mammalian digestive tract. Giardia is present worldwide, with the highest occurrence in areas with poor sanitation. In the United

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States most reported cases are in mountainous regions where drinking water is obtained from streams and is unfiltered or untreated

Giardia is contracted by ingesting water contaminated with giardia cysts in the dormant state Giardia parasites can only thrive in the digestive tracts of mammals Dormant giardia organisms enter water through the feces of infected animals or humans Giardia symptoms include severe diarrhea and upset stomach Some people are asymptomatic but can transmit the disease to others Medical treatment of giardia can be difficult and unpleasant therefore prevention is critical Precautions for preventing exposure to giardia are listed below

- Workers should assume that all fresh water streams are infected with the giardia organism and not drink any untreated water
- Team members collecting sediment and water samples from streams should wash their hands thoroughly with soap and water after collecting the samples
- Giardia parasites are relatively easy to destroy or filter Water should be treated for drinking or cooking with iodine or another recommended giardia treatment before use

6 0 HANTAVIRUS

Hantavirus pulmonary syndrome (HPS) is a potentially fatal infection caused by a rodent borne hantavirus HPS begins with a brief illness most commonly characterized by fever muscle pain headache coughing and nausea or vomiting Other early symptoms include chills diarrhea shortness of breath abdominal pain and dizziness In the first identified cases of HPS this stage of the infection lasted 2 to 5 days before victims were hospitalized Typically by the time of hospitalization victims were found to have tachycardia (a heart rate of greater than 100 beats per minute) and tachypnea (a breathing rate of greater than 20 breaths per minute) Fever was also common In most cases death occurred within 2 to 16 days of the onset of symptoms and victims exhibited pulmonary edema and severe hypotension

Currently experts believe that HPS is spread by the deer mouse (*Peromyscus maniculatus*) Though the deer mouse has been found to be the primary host of hantavirus several other rodent species have also tested positive for the virus Pinon mice (*Peromyscus truei*) brush mice (*Peromyscus boylii*) and western

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chipmunks (*Tamias spp*) are also likely to carry the virus. Also cases of HPS have been reported in areas of the United States where these particular rodents are not indigenous.

Infected rodents shed the virus in their urine, feces, and saliva. Humans can be exposed to the virus through (1) inhalation of suspended rodent excreta or dust particles containing rodent excreta, (2) introduction of rodent excreta into the eyes or broken skin, and (3) ingestion of food or water contaminated by rodent excreta. HPS has a reported mortality rate of 55 percent. Transmission of hantavirus from infected individuals to healthy persons has not been documented.

Prevention of HPS infection is essential because no known antidote and no specific treatment exists for treating HPS. Therefore, employees should practice risk reduction and control measures. Guidelines for workers in locations that may have rodent infestations or habitats are listed below.

- The best approach for HPS control and prevention is through environmental hygiene practices that deter rodents from colonizing the work environment.
- Information about the symptoms of HPS and detailed guidance on preventive measures should be provided to all employees assigned to field activities.
- Medical attention should be sought immediately for workers who develop a febrile or respiratory illness within 45 days of the last potential exposure to rodents. Attending physicians should be advised of each worker's potential for occupational exposure to hantavirus. Physicians should contact local health authorities promptly if hantavirus-associated illness is suspected. A blood sample should be obtained from the affected worker and forwarded with the baseline serum sample through the state health department to the Centers for Disease Control and Prevention for hantavirus antibody testing.
- Respiratory protective equipment should be worn when handling rodents, when removing rodents from traps, and when working in areas with evidence of rodent droppings or hair. Respiratory protective equipment should include, at a minimum, a half-face air-purifying respirator (APR) or powered APR equipped with a high-efficiency particulate air (HEPA) filter (P100). Full-face regulators may be needed under some circumstances. Respiratory protective equipment should be used in accordance with Occupational Safety and Health Administration regulations.
- Dermal protection should be worn when handling rodents or traps containing rodents, or if contact with contaminated surfaces could occur. Dermal protection should include rubber or plastic gloves that should be washed and disinfected before removal.

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- A trap contaminated with rodent urine or feces or in which a rodent was captured should be disinfected with a commercial disinfectant or a 0.4 percent bleach solution. A dead rodent should be disposed of by placing the carcass in a plastic bag containing enough general purpose household disinfectant to thoroughly wet the carcass. The bag should be sealed and disposed of by burning or by burying it in a 2 to 3 foot deep hole. Local and state health departments can also provide appropriate disposal methods.

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TETRA TECH, INC
HEALTH AND SAFETY MANUAL
VOLUME III

SAFE WORK PRACTICES (SWP)

PERMIT-REQUIRED CONFINED SPACE ENTRY PRACTICES

SWP NO 6-23
ISSUE DATE JULY 1998
REVISION NO 1

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swp6-23_permit required_confined_space_entry_practices.doc

PERMIT-REQUIRED CONFINED SPACE ENTRY PRACTICES

This safe work practice (SWP) presents procedures that must be followed for all permit required confined space entries. If any of the space preparation or entry requirements discussed in this SWP cannot be met, entry shall not proceed until the space is evaluated by the project manager and the site safety coordinator (SSC).

This SWP supplements Document Control No 2 5 Confined Space Entry Program and provides specific procedures for permit required confined space entry. This SWP must be included with the health and safety plan for all projects with permit required confined space entry.

The entry permit, hazard inspection, atmospheric testing, ventilation, respiratory protection, pre entry briefing, communication, evacuation, and rescue provisions for permit required confined space entry are discussed below.

1 0 ENTRY PERMIT

Tetra Tech Inc (Tetra Tech) has established a confined space entry permit (CSEP) system to ensure safe entry and safe performance of work within a permit required confined space. Before entry into a permit required confined space can occur, a CSEP must be issued. The CSEP is a written authorization and approval that specifies the location of the confined space, specifies the type of work to be conducted in the space, certifies that all existing and potential hazards have been evaluated, and verifies that necessary protective measures have been taken to ensure the safety of each worker.

The CSEP is Form CS 1 in Volume III and must be completed in its entirety and signed by a permit authorizer (either the project manager or the SSC). Blank entries are not allowed, and all sections requesting a specific time or date must be completed. Additional sheets may be necessary.

The permit authorizer shall do the following:

- Determine that the entry permit contains the requisite information and that all tests specified by the permit have been conducted before endorsing the permit and allowing entry.

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- Determine that the necessary procedures practices and equipment necessary for safe entry are in effect before allowing entry
- Cancel entry authorization and terminate entry whenever unacceptable entry conditions are present
- Take the necessary steps for concluding an entry operation such as closing off a permit space and canceling the permit once the authorized work has been completed
- Ensure that confined space entrants are properly trained and that an authorized attendant will remain outside of the confined space to monitor the entrants throughout the entire entry

The permit authorizer must be readily available for reviewing the permit and must personally inspect the confined space before the startup of the entry task The permit authorizer shall then sign the permit

The completed permit shall be posted at the entry portal or displayed by any other equally effective means before entry activities begin so that authorized entrants can confirm that all pre entry preparations have been completed All authorized entrants shall initial the CSEP after their name after reviewing it

A copy of the CSEP shall be furnished to the project manager and the office health and safety representative The original copy of the permit shall be retained as a permanent record in the project file The CSEP posted at the work site shall be removed upon completion of the job or the end of the shift whichever is first

The date and time the permit has been authorized for shall be indicated on the permit Permits are valid for a maximum of 8 hours Reauthorization of the permit shall be required for each day of entry

A CSEP becomes void under any of the following conditions

- If work in the confined space does not start within 1 hour after atmospheric testing is performed
- The job is interrupted for more than 60 minutes for any reason
- Atmospheric testing of the confined space is discontinued

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- Atmospheric changes occur resulting in (1) an oxygen content below 19.5 percent or above 23.5 percent (2) greater than 10 percent of the lower explosive limit (LEL) of combustible gases or vapors or (3) concentration of a hazardous airborne contaminant exceeding its permissible exposure limit
- Injury or illness of an entrant
- A power failure affecting lighting or telephone usage
- Severe weather

2.0 HAZARD INSPECTION

Before scheduling a confined space entry, the permit authorizer shall inspect the area around the confined space for (1) sources of combustion exhaust, (2) flammable gases, (3) sparks and fire, and (4) objects that might fall into the space.

The confined space and the scope of work within that space shall be evaluated to identify potential hazards and identify and implement appropriate hazard controls. The permit authorizer shall ensure that appropriate hazard controls are in place prior to entry activities. Such hazard controls can include, but are not limited to, the following:

- Lockout and tagout requirements
- Confined space cleaning procedures
- Equipment and tool requirements
- Safe entry and exit procedures
- Physical hazard controls (such as hearing protection and heat stress controls)

Each hazard control identified above is specifically detailed in the Document Control No. 2.5 in Volume I: Confined Space Entry Program.

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3 0 ATMOSPHERIC TESTING

Atmospheric testing shall be conducted to evaluate the potential hazards and verify that entry conditions for the space are acceptable Atmospheric testing equipment is described in Document Control No 3 7 Air Monitoring Program The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise so that appropriate permit procedures can be developed to ensure safe entry

The duration of testing for each atmospheric contaminant shall be made for at least the minimum response time of the test instrument as specified by the manufacturer plus an allowance for dead space in sampling lines

Testing shall be conducted to ensure that all spaces are surveyed for hazardous conditions and shall include all sections of noncontiguous spaces and all levels of each space to account for stratification When monitoring for entries involving descent into atmospheres that may be stratified measurements shall be recorded at a distance of approximately 4 feet in the direction of travel and to each side If a sampling probe is used the entrant s rate of progress should be slowed to accommodate the sampling speed and the detector response

Atmospheric testing shall be conducted in the following order

- Oxygen content must be tested for first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere
- Combustible gases must be tested for next because the threat of fire or explosion is more immediate and life threatening in most cases than exposure to toxic gases and vapors
- Toxic gases and vapors must be tested for last for specific toxic gases and vapors as necessary

Continuous monitoring for oxygen combustible gases and specific hazardous contaminants is required in all permit required confined spaces unless lack of such monitoring is specifically approved by the corporate health and safety manager regional health and safety representative (RHSR) or subsidiary health and safety representative (SHSR) Results shall be noted regularly on Form CS 1

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Equipment for continuous monitoring of gases and vapors shall be explosion proof (intrinsically safe) and equipped with an audible alarm that will alert personnel when a hazardous condition develops. Testing equipment shall be calibrated in accordance with the manufacturer's recommendations. Calibration parameters shall be recorded in the field logbook, and each piece of equipment will be tagged with its calibration results. Calibration records should be included in the permanent project file.

Pre entry evaluation must, at a minimum, include remote atmospheric testing before employee entry and before validation or revalidation of a CSEP to ensure the following:

- An oxygen content between 19.5 and 23.5 percent
- Less than 10 percent LEL of combustible gas
- The absence of other atmospheric contaminants if the space contained toxic, corrosive, or irritant materials

Pre entry evaluation test data and entry procedures should be reviewed by or under the direction of a technically qualified individual such as a certified industrial hygienist, certified safety professional, or a certified marine chemist.

Verification testing of the atmosphere of the permit space shall be conducted for all contaminants identified during evaluation testing procedures at the time of entry in order to verify that concentrations are within the range of acceptable conditions. Testing results shall be recorded on the CSEP for the space.

4.0 VENTILATION

Natural ventilation of the confined space prior to initial entry and for the duration of the CSEP shall be provided. However, positive pressure forced mechanical ventilation may also be required. Before forced ventilation is initiated, information such as restricted areas within the confined space, voids, the nature of contaminants present, the size of the space, the type of work to be performed, and the number of entrants involved should be considered. The procedures listed below also apply.

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- The confined space shall be ventilated before starting work and for the duration of the time that work is to be performed in the space
- Ventilation air should not create an additional hazard resulting from recirculation of contaminants improper arrangement of the inlet duct or substitution of anything other than Grade D or fresh air
- When air moving equipment is used to provide ventilation the equipment shall be tested before each shift and provided with an audible alarm to signal ventilation failure
- Chemicals shall be removed from the vicinity of the air supply to prevent their introduction into the confined space by air moving equipment or any other means
- Vehicles shall not be left running near confined spaces or near air moving equipment being used for confined space ventilation because vehicle exhaust can act as a source of carbon monoxide

5 0 RESPIRATORY PROTECTION

Respiratory protection needed for confined space entry shall be determined by a technically qualified person such as a Tetra Tech health and safety specialist based on site conditions air monitoring results for the confined space and the work activity to be performed Air purifying respirators with appropriate cartridges can be worn only if (1) testing indicates that the atmosphere is not oxygen deficient (2) the contaminants are at concentrations below the protection factor of the respirator selected and (3) an approved respiratory hazard assessment has been completed (Form RP 2 Volume III)

Self contained breathing apparatuses (SCBA) or National Institute for Occupational Safety and Health certified positive pressure airline respirators equipped with a 5 minute emergency air supply (egress bottle) shall be used in any confined space when conditions have been determined to be immediately dangerous to life and health

6 0 PRE-ENTRY BRIEFING

Immediately before entering a confined space the authorized attendant and entrants shall again review all potential hazards and emergency procedures during a pre entry briefing The following topics shall be discussed

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- CSEP components
- Work to be completed and the time period the CSEP shall remain in effect
- Location of telephone and emergency numbers
- Atmospheric physical electrical and miscellaneous hazards expected in the space
- Rescue provisions and procedures
- Reasons to evacuate the confined space

7 0 COMMUNICATION

When visual monitoring of the entrants is not possible because of the layout of the confined space the authorized attendant shall maintain voice contact as necessary to monitor entrant status and to alert entrants of the need to evacuate the space

Attendants shall not enter the space to communicate with entrants Passing of the head through the plane of the opening is not allowed The attendant shall also know emergency telephone numbers If a mobile telephone or radio is not available other communication procedures must be arranged

8 0 EVACUATION

Evacuation of the permit required confined space will be initiated if any of the following conditions arise

- Observation of a condition not allowed on the CSEP
- Entrant exhibits signs or symptoms of hazardous exposure
- Situation outside the space endangers entrants
- Uncontrolled hazard (such as fire or spill)
- Loss of power or ventilation
- Monitoring equipment malfunctions
- Authorized attendant must leave

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9 0 RESCUE PROVISIONS

Provisions must be made for rescue equipment and procedures for each permit required confined space entry. If a worker becomes ill or injured, the attendant will contact the nearest emergency response team (by dialing 911 or a site specific emergency telephone number). The attendant may then attempt to retrieve the ill or injured employee by retrieval line until arrival of a rescue team. If rescue operations are provided by non Tetra Tech personnel, the rescue personnel must be informed of the hazards they may confront during rescue.

Under no circumstances shall the attendant enter the confined space to attempt rescue unless trained and equipped for rescue operations and relieved of his or her attendant duties. The attendant must have appropriate rescue respiratory protection available for rescue teams. This equipment must include a positive pressure airline (with 5 minute escape bottle) or SCBA. Anyone using emergency respiratory equipment must have received training in its use.

To facilitate non entry rescue, retrieval systems or methods shall be used when an authorized entrant enters a permit space unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. The authorized entrant shall be fitted with a chest or full body harness with a retrieval line attached at a suitable point so that if rescued, the employee easily fits through the entrance. Wristlets can be used when the use of a chest or full body harness would present a hazard and the use of wristlets is the safest and most effective alternative.

A mechanical retrieval device shall be available to retrieve personnel from a vertical type permit required space more than 5 feet deep. The line will be at least 0.5 inch in diameter and tested for 2,000 pounds. Mechanical retrieval devices are not required for spaces less than 5 feet deep or during horizontal entries. A simple retrieval line on the entrant can be tied off outside the entrance for these spaces.

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TETRA TECH, INC
HEALTH AND SAFETY MANUAL
VOLUME III

SAFE WORK PRACTICES (SWP)

RESPIRATOR CLEANING PROCEDURES

SWP NO 6-27
ISSUE DATE FEBRUARY 1999
REVISION 0

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RESPIRATOR CLEANING PROCEDURES

This safe work practice (SWP) provides guidelines for proper and thorough cleaning of respiratory protection equipment. The Occupational Safety and Health Administration (OSHA) regulates the use of respiratory protection for general industry in Title 29 of the *Code of Federal Regulations* (CFR) Part 1910.134 Respiratory Protection. Appendix B.2 of the standard outlines mandatory requirements for respirator cleaning and is used as the basis for this SWP. This SWP supplements Document Control No. 2.6 Respiratory Protection Program. It provides specific respirator cleaning and disinfection procedures and shall be included as an attachment to the site specific health and safety plan for projects for which respirator use is planned or is a contingency.

1.0 APPLICABILITY

This SWP shall apply to any project that involves use of respirators with reusable facepieces.

Respirators shall be cleaned and disinfected as discussed below:

- Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition.
- Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals.
- Respirators maintained for emergency use shall be cleaned and disinfected after each use.
- Respirators used in fit testing and training shall be cleaned and disinfected after each use.

2.0 CLEANING AND DISINFECTION PROCEDURES

Mandatory respirator cleaning procedures as defined in 29 CFR Part 1910.134 Appendix B.2 are listed below. All wash and rinse water should be warm with a maximum temperature of 110 °F (43 °C).

1. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure demand valve assemblies, hoses, and any other components as recommended by the manufacturer. Discard or repair any defective parts.

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- 2 Wash components in warm water with a mild detergent or with a cleaner recommended by the manufacturer A stiff bristle (not wire) brush may be used to facilitate the removal of dirt
- 3 Rinse components thoroughly in clean warm preferably running water Drain all components
- 4 When the cleaner does not contain a disinfecting agent respirator components should be immersed for 2 minutes in one of the following
 - Hypochlorite solution [50 parts per million (ppm) of chlorine] made by adding approximately one milliliter of laundry bleach to 1 liter of warm water
 - Aqueous solution of iodine [50 ppm iodine made by adding approximately 0.8 milliliter of tincture of iodine (6 to 8 grams ammonium and/or potassium iodide per 100 cubic centimeters of 45 percent alcohol) to 1 liter of warm water]
 - Other commercially available cleansers of equivalent disinfectant quality when used as directed if their use is recommended or approved by the respirator manufacturer
- 5 Rinse components thoroughly in clean warm preferably running water Drain all components The importance of thorough rinsing cannot be over emphasized Detergents or disinfectants that dry on facepieces may cause dermatitis In addition some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed
- 6 Components should be air dried or hand dried with a clean lint free cloth
- 7 Reassemble the facepiece Replace filters cartridges and canisters prior to next use
- 8 Test the respirator to ensure that all components work properly
- 9 Place the respirator in a clean bag and seal for storage

Depending on work conditions respirator facial sealing surfaces may need periodic cleaning during the course of daily use Cleaning of the facial sealing surface during work breaks can reduce the chance of facial irritation caused by sweat natural skin oil or irritating materials that may have deposited on the facepiece Facial sealing surfaces can be cleaned using disinfectant wipes soaked in isopropyl alcohol or benzalkonium chloride After use of the disinfectant wipe, the sealing surface should air dry or be dried thoroughly using paper towels or tissues

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TETRA TECH, INC
HEALTH AND SAFETY MANUAL
VOLUME III

SAFE WORK PRACTICES (SWP)

SAFE WORK PRACTICES FOR USE OF AIR PURIFYING RESPIRATORS

SWP NO 6-28
ISSUE DATE FEBRUARY 1999
REVISION 0

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SAFE WORK PRACTICES FOR USE OF RESPIRATORS

This safe work practice (SWP) was developed to ensure the proper use of respirators in routine and foreseeable emergency situations. The SWP supplements Document Control No 2 6 Respiratory Protection Program. This SWP shall be included as an attachment to the site specific health and safety plan (HASP) for projects for which respirator use is planned or is a contingency.

1 0 APPLICABILITY

This SWP shall apply to any project that involves use of air purifying respirators and shall not be used for situations involving the use of supplied air systems such as self contained breathing apparatuses and air line apparatuses.

2 0 ROUTINE RESPIRATOR USE PROCEDURES

The procedures below apply to the routine use of air purifying respirators.

- Respirators shall not be issued to or worn by individuals when conditions prevent valve function or a good facial seal. These conditions may include but are not limited to facial hair such as the growth of beard, sideburns, or excessive mustaches, and possibly the wearing of corrective eyeglasses.
- If spectacles, goggles, face shields, or welding helmets must be worn with a facepiece, they will be worn so as not to adversely affect the seal of the facepiece to the face.
- For all tight fitting respirators, a positive and negative pressure seal check shall be performed each time the respirator is donned. Seal checks shall be performed as follows:
 - *Negative pressure check*: Close off the inlet opening of the canister or cartridge(s) by covering it with the palm of the hand(s), inhale gently so that the facepiece collapses slightly, and hold the breath for 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is satisfactory.
 - *Positive pressure check*: Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. The exhalation valve cover may have to be removed to perform this procedure.

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- *Manufacturer s recommended seal check* If the respirator manufacturer recommends specific procedures for performing a user seal check these procedures may be used instead of the negative and positive pressure checks
- Work areas must be monitored for conditions that may adversely affect the effectiveness of respiratory protection Employees may leave the work area where respirators are required under the following conditions
 - To wash the face and respirator facepieces as necessary to prevent eye or skin irritation
 - If vapor or gas breakthrough changes in breathing resistance or leakage of the facepiece is detected
 - To replace the respirator or the filter cartridge or canister elements
 - If established monitoring instrument action levels are exceeded
 - For any other criteria as established in a project specific health and safety plan

3 0 RESPIRATOR USE DURING EMERGENCY SITUATIONS

Emergency situations may arise during the wearing of respiratory protection These situations could include medical emergency respirator failure fire chemical spills or leaks and other events that pose an immediate risk Procedures for respirator use during emergency situations are summarized below

- When an emergency situation arises that creates or has the potential to create immediately dangerous to life and health (IDLH) conditions the work environment shall be evacuated immediately and shall not be reentered by employees without suitable protective gear
- Work environments with the potential for the development of atmospheres that may present IDLH conditions shall only be entered by employees using the buddy system
- When an emergency situation arises that includes physical hazards that may interfere with the proper use of respiratory protection the work environment shall be evacuated
- Under no circumstances shall respirator users remove facepieces in hazardous atmospheres In the event of respirator malfunction users should leave the hazardous environment immediately and proceed to a known safe location before removal of the facepiece
- Episodes of respirator failure shall be thoroughly investigated before work activities begin again The investigation shall include re evaluation of work area atmospheric

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conditions review of the respirator selection criteria and service life calculations and an evaluation of the working conditions under which respirator failure occurred

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APPENDIX C

RESPIRATORY HAZARD ASSESSMENT (FORM RP-2)

(Two Pages)

Note This assessment form will be finalized when site air monitoring data are collected and evaluated. Until the assessment is completed, air purifying respirator cartridges will be disposed of every 8 hours.



TETRA TECH, INC
RESPIRATORY HAZARD ASSESSMENT

Project Name				Project No	
Location				Project Manager	
Type <input type="checkbox"/> Baseline <input type="checkbox"/> Reassessment			Date		Valid for ____ days
Job/Task Description				<input type="checkbox"/> Routine <input type="checkbox"/> Escape	
Hazard Identification and Source			Workplace Factors		User Factors
			Temperature _____		Work rate _____
			Humidity _____		Protective clothing _____
			Other _____		Other _____
Chemical					
PEL					
ACGIH TLV					
Form (part/gas/vapor)					
IDLH					
Eye Irritant (Y/N)					
Skin Absorption(Y/N)					
Monitoring (Y/N) *					
Frequency					
Maximum Concentration Estimated **					
* Monitoring Method <input type="checkbox"/> PID <input type="checkbox"/> NIOSH method _____ <input type="checkbox"/> FID <input type="checkbox"/> Vapor badge _____ <input type="checkbox"/> Detector tube _____ <input type="checkbox"/> Other _____			Respirator Type		
			<input type="checkbox"/> Half face disposable Brand _____		
			<input type="checkbox"/> Half face reusable Brand _____		
			<input type="checkbox"/> Full face Brand _____		
			<input type="checkbox"/> Air supplied airline Brand _____		
			<input type="checkbox"/> Air supplied SCBA Brand _____		
			<input type="checkbox"/> PAPR Brand _____		
			<input type="checkbox"/> ESCBA Brand _____		
** If concentrations exceed the immediately dangerous to life and health (IDLH) value use air supplied systems			Vapor and Gas Cartridge Exchange		
			ESLI <input type="checkbox"/> Yes <input type="checkbox"/> No Exchange frequency _____		
Cartridge/Filter Selection <input type="checkbox"/> N100 <input type="checkbox"/> R100 <input type="checkbox"/> P100 <input type="checkbox"/> N99 <input type="checkbox"/> R99 <input type="checkbox"/> P99 <input type="checkbox"/> N95 <input type="checkbox"/> R95 <input type="checkbox"/> P95 <input type="checkbox"/> Organic vapor <input type="checkbox"/> Acid gas <input type="checkbox"/> Ammonia <input type="checkbox"/> Mercury <input type="checkbox"/> Formaldehyde <input type="checkbox"/> Combo _____ <input type="checkbox"/> Other _____			Basis for Exchange Frequency		
			<input type="checkbox"/> Manufacturer s data <input type="checkbox"/> Workplace simulations		
			<input type="checkbox"/> Experimental methods <input type="checkbox"/> AIHA Rules of Thumb		
			<input type="checkbox"/> Predictive modeling <input type="checkbox"/> Analogous chemical structure		
			<input type="checkbox"/> OSHA Regulation _____		
			<input type="checkbox"/> Other _____		
Completed by _____ Date _____			Reviewed by _____ Date _____		

RESPIRATORY HAZARD ASSESSMENT (Continued)

DEFINITIONS AND ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ESLI	End of service life indicator
FID	Flame ionization detector
IDLH	Immediately dangerous to life and health
NIOSH	National Institute for Occupational Safety and Health
N100/99/95	Non oil proof particulate filter
OSHA	Occupational Safety and Health Administration
P100/99/95	Oil proof particulate filter
PEL	Permissible exposure limit
PID	Photoionization detector
PPE	Personal protective equipment
R100/99/95	Oil resistant particulate filter
SCBA	Self contained breathing apparatus
TLV	Threshold limit value

Note This form must be reviewed by a regional health and safety representative or subsidiary health and safety representative (or designee) only and must be attached to the site-specific health and safety plan once completed. A copy must also be placed in the project files.